Avocent® Universal Management Gateway Appliance

Installer/User Guide

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NOTE: This document supports versions up to and including release 2.8.

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Product Overview

The Avocent® Universal Management Gateway appliance serves as a single point for secure local and remote access and administration of target devices. The Avocent® Universal Management Gateway appliance supports secure remote data center management and out-of-band management of IT assets from any location worldwide. It provides keyboard, video and mouse (KVM) capabilities and can also remotely perform server management tasks, including power control and console access, on managed target devices. Multiple administrators can be logged into the appliance at the same time and can use the web user interface (UI), the command line interface (CLI) or DSView™ 4 management software to access and configure the appliance.

NOTE: All instances of DSView™ software in this document refer to DSView™ software version 4 or higher.

The Avocent® Universal Management Gateway appliance combines KVM over IP, Service Processor Management (SPM) and access and serial console management access. It gives you flexible target device management control and secure remote access from anywhere at anytime.

Features and Benefits

Secure access

You can securely access the appliance through the following local (analog console port) and remote (digital IP) options:

- LAN/WAN IP network connection.
- Serial target device connection. An authorized user can make a Telnet, SSH v1, SSH v2 or raw connection to a target device. For Telnet or SSH to be used for serial target device connections, the Telnet or SSH service must be configured in the Security Profile that is in effect.
- Console connection. An administrator can log in either from a local terminal or from a computer with a terminal emulation program that is connected to the console port and can use the CLI.

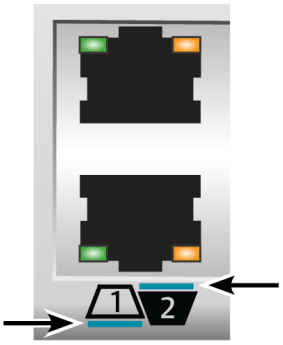
Autosense

The Avocent® Universal Management Gateway 2000 appliance has eight autosensing ports that can be used for either service processor (SP) or serial connectivity and management. It has an additional 32 RJ-45 ports which are intended solely for SP connectivity and management. The

Avocent® Universal Management Gateway 4000 and 6000 appliances have 40 autosensing ports that can be used for service processor (SP) or serial connectivity and management.

Ports that support autosensing are designated on the back of the appliance with a small turquoise line next to the port number. Ports indicate which mode of operation is currently active with a green or amber connection LED. By default, all ports capable of autosensing are in automode. It is recommended to leave the port set to autosense. This is indicated by having both the green and amber LEDs illuminated. If a port is statically set to one of the two modes, the corresponding LED will be the only one illuminated.

Autosensing Port



Network and serial mode

The autosensing ports can operate in network or serial mode. Each major mode has sub modes called port classes. The network port class is for network or SP connections. The port will autosense network targets but will need to be manually configured for SP connected targets. The serial port class is for console connections or PDU connections. By default, the serial port class will autosense to a console connection and will need to be manually configured for a Power Distribution Unit (PDU) connection. The ports will autosense and switch to the appropriate mode depending on the target attached to the appliance.

When a port is in network mode, the green LED will be illuminated. The appliance will provide an IP address to the network device attached to it. It is only intended to be connected to the device to be managed or accessed. The appliance will not function as a traditional network switch or common network access firewall. It is a special purpose appliance intended for target device access and management.

CAUTION: Since the appliance issues IP addresses using DHCP, they could conflict with a production DHCP infrastructure. Proper VLAN segmentation must be assigned on the network to avoid this conflict.

IP addresses can also be assigned statically to SPs, and the appliance can scan IP ranges to discover them.

When a port is in serial mode, the amber LED will be illuminated. The appliance will assign the console port class by default and auto-detect whether to apply the Avocent or Cisco® soft pinout. The speed, flow control, parity and data-size are all predefined for connectivity to standard RS-232 server consoles but can be modified on a per-port basis. In addition to console mode, a supported Avocent PDU can be connected to and managed from the appliance.

Web user interface (UI)

Users and administrators can perform most tasks through the web UI (accessed with HTTPS). The web UI runs in Microsoft Internet Explorer® and Mozilla Firefox® browsers on any supported computer that has network access to the appliance.

An administrator can use the web UI to create user accounts, authorize groups and configure security and ports. Authorized users can access connected devices through the web UI to troubleshoot, maintain, cycle power, or to reboot connected devices and change their password. For more information on the web UI, see Chapter 3.

VGA and USB connections

Standard VGA and USB connections can be used to attach an LCD tray. These ports are located on the front of the appliance. The VGA console port can be used for launching sessions to targets or for performing NetBoot firmware recoveries. The USB ports are used for connecting USB keyboard, mouse, smart card reader, CD, DVD or mass storage devices.

VGA Console Hotkeys

Key Combination	Operation
Alt + Tab	Toggle to next view in a cyclic list
Alt + F1	View web UI
Alt + F2	View User Shell
Alt + Esc	Close current view and session

NOTE: Press **ALT-F1** during the appliance boot progress screen to display verbose output.

CLI setup port

The serial setup port provides access to the CLI and Shell. The appliance does not support root access to the Bash Shell. The CLI is intended for managing and configuring the appliance.

IPv4 and IPv6 support

The appliance supports dual stack IPv4 and IPv6 protocols. The administrator can use the web UI or CLI to configure support for IPv4 and/or IPv6 addresses. The following list describes the IPv4 and IPv6 support provided in the appliance:

- DHCP
- DSView software integration
- Ethernet interfaces, GB1 (eth0) and GB2 (GB2 (eth1))
- Firewall (IP tables)
- HTTPS
- Linux kernel
- Remote authentication: AD and LDAP servers
- SSH and Telnet access
- Syslog server

NOTE: Remote authentication NFS, NIS and IPSec are not supported with IPv6.

Security

The Security settings allow administrators to determine which network services are enabled on the appliance.

Data logging, notifications, alarms and data buffering

An administrator can set up data logging, notifications and alarms to alert administrators of problems with email and syslog messages. An administrator can also store buffered data locally. Messages about the appliance and connected servers or devices can also be sent to syslog servers.

Power management

The Avocent® Universal Management Gateway appliance enables users who are authorized for rack power distribution units (PDU) and service processor (SP) power management to turn power on, turn power off and reset servers via their embedded SP devices plugged into a connected rack PDU.

Auto discovery

An administrator can enable auto discovery to find the hostname of a target connected to a port. Auto discovery's default probe and answer strings have a broad range. An administrator can

configure site-specific probe and answer strings. Auto discovery can also be configured through the DSView™ software.

Supported SPs

The appliance supports rack and blade server SPs from the following vendors: Dell®, HP, IBM®, Cisco®, Fujitsu®, Oracle® Sun and additional IPMI implementations. For a complete list of SPs supported by your appliance, visit www.avocent.com/updates to see the release notes that match your appliance firmware version.

Control of virtual media and smart card-capable appliances

The Avocent® Universal Management Gateway appliance allows you to view, move or copy data located on virtual media to and from any target device. Manage remote systems more efficiently by allowing operating system installation, operating system recovery, hard drive recovery or duplication, BIOS updating and target device backup.

Smart cards such as the Common Access Card (CAC) can be used to store identification and authentication to enable access to computers, networks and secure rooms or buildings.

Virtual media and smart card readers can be connected directly by using USB ports located on the appliance. In addition, virtual media and smart card readers may be connected to any remote workstation that is running the remote web UI or DSView™ management software and is connected to the appliance using an Ethernet connection.

Flexible users and groups

An account can be defined for each user on the appliance or on an authentication server. An administrator has an account by default and can add and configure other user accounts. Access to ports can be optionally restricted based on authorizations an administrator can assign to custom user groups.

DSView™ management software plug-in

The DSView™ management software may be used with the appliance to allow IT administrators to remotely access, monitor and control target devices on multiple platforms through a single, web-based user interface. DSView™ software proxy and SSH Pass-through features enable convenient and secure remote access for LAN and WAN clients. For more information, see the DSView™ 4 Management Software Plug-In for the Avocent® Universal Management Gateway Appliance Technical Bulletin.

Installation

Before installing your Avocent® Universal Management Gateway appliance, refer to the following list to ensure you have all items that shipped with it, as well as other items necessary for proper installation.

Supplied with the Appliance

- Appliance Quick Installation Guide (QIG)
- Avocent® Universal Management Gateway Appliance Mounting Bracket Quick Installation Guide (QIG)
- Power Cords
- RJ-45 to DB-9F cross adaptor
- Mounting brackets and screws
- Safety and Regulatory Statements Guide

Rack and Wall Mounting

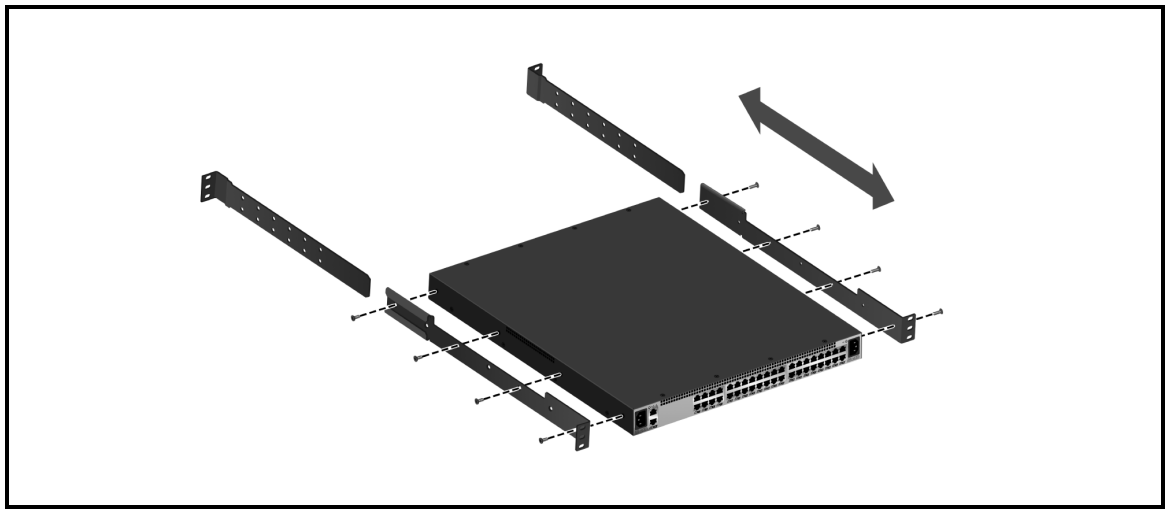
You can mount the appliance in a rack or cabinet; or, using the optional wall-mounting kit, you can mount it on a wall.

Rack mounting

To rack mount the appliance:

1. Remove the four black screws from each side of the Avocent® Universal Management Gateway appliance. Position each bracket so it is not covering the side vents of the appliance. Secure the mounting brackets to the appliance using the eight chrome screws supplied with the appliance.
2. Loosely attach the two slide-rail brackets to the front of the rack using the appropriate screws for your rack.
3. From the rear of the rack, slide the appliance into the same U position where the slide rails are mounted. Ensure that both slide rails are securely inserted into the appliance bracket. Tighten the rack screws for both the appliance bracket and the slide rails.

Bracket Connections for Rack Mount Configuration



Rack mount safety considerations

- Elevated Ambient Temperature: If installed in a closed rack assembly, the operating temperature of the rack environment may be greater than room ambient. Use care not to exceed the rated maximum ambient temperature of the appliance.
- Reduced Air Flow: Installation of the equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.
- Mechanical Loading: Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Circuit Overloading: Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits might have on overcurrent protection and supply wiring. Consider equipment nameplate ratings for maximum current.
- Reliable Earthing: Reliable earthing of rack mounted equipment should be maintained. Pay particular attention to supply connections other than direct connections to the branch circuit (for example, use of power strips).

Wall mounting

NOTE: The wall-mounting kit is optional and is not included with the appliance; it must be purchased separately. For details on how to purchase the wall-mounting kit, contact your Avocent representative.

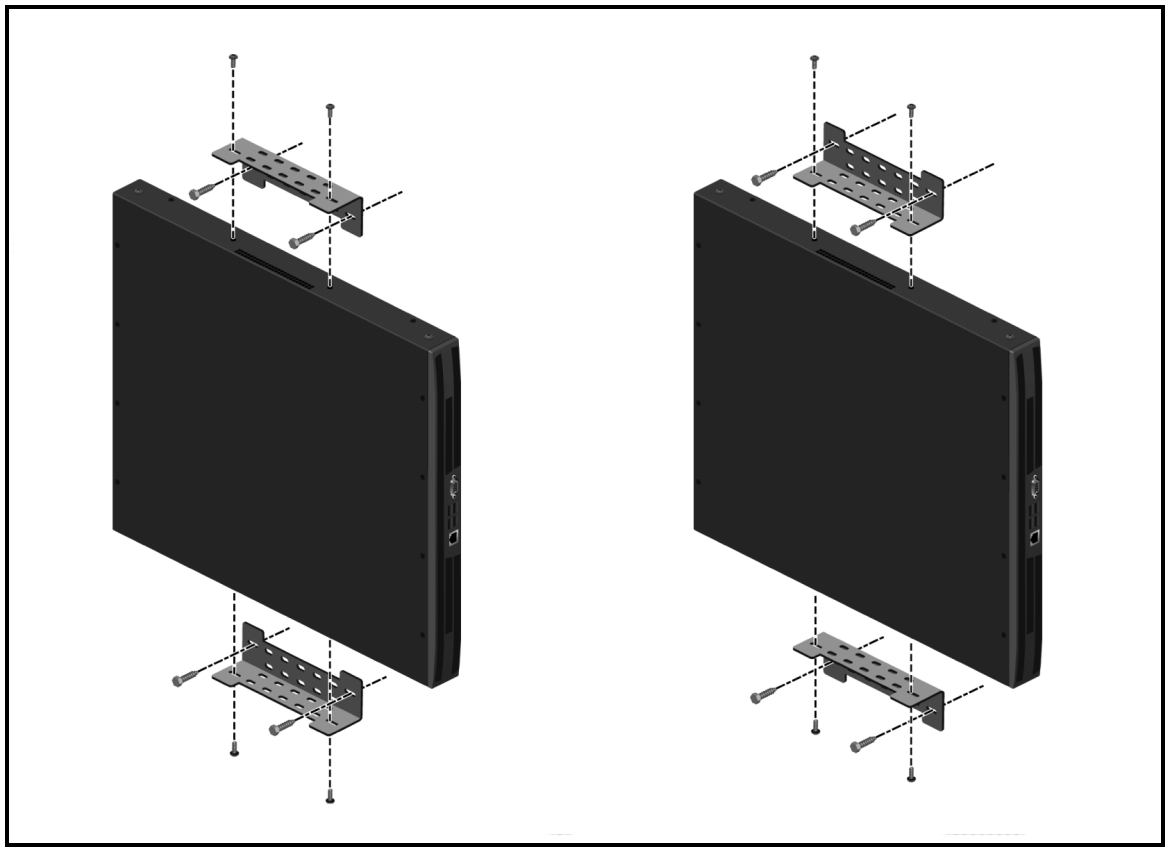
To wall mount the appliance:

1. Using the slots on the bracket or the supplied template as a guide, mark the holes in the plywood wall where the brackets are to be fastened. A minimum of two holes for each bracket

should be marked. Use a 3/16-inch drill bit to drill guide holes at the marked positions. Using 1/4 inch by 1 inch hex lag screws (not included with the wall-mounting kit), secure each bracket to the plywood wall, using at least two screws for each bracket.

2. Remove the two middle truss-head screws from each side of the appliance. It is important to remove only the middle two screws allowing the cover of the appliance to stay secured. Align the holes in the appliance with the holes in the mounted brackets and, using the thumb screws provided with the wall-mounting kit, secure it to the brackets with the slots facing up or down, as illustrated.

Bracket Connections for Wall Mount Configuration



Wall and 0U mounting safety considerations

Wall mounting is permitted with an optional wall-mounting kit (sold separately). If wall mounting or 0U mounting in an equipment rack, the appliance must be mounted so that its front face is facing sideways and not toward the floor or ceiling.

Cabling installation, maintenance and safety tips

WARNING: To avoid potentially fatal shock hazard and possible damage to equipment, please observe the following precautions.

The following is a list of important safety considerations that should be reviewed prior to installing or maintaining your cables:

- Dress the cables neatly with cable ties, using low to moderate pressure. Do not overtighten ties.
- If bending the cable is necessary, make it gradual with no bend sharper than a one inch radius. Allowing the cable to be sharply bent or kinked can permanently damage the cable's interior.
- Cross-connect cables where necessary, using rated punch blocks, patch panels and components. Do not splice or bridge cable at any point.
- Keep UTP cable as far away as possible from potential sources of EMI, such as electrical cables, transformers and light fixtures. Do not tie cables to electrical conduits or lay cables on electrical fixtures.
- Always test every installed segment with a cable tester. Toning alone is not an acceptable test.
- Always install jacks so as to prevent dust and other contaminants from settling on the contacts. The contacts of the jack should face up on the flush mounted plates, or left/right/down on surface mount boxes.
- Always leave extra slack on the cables, neatly coiled in the ceiling or nearest concealed location. Leave at least five feet at the work outlet side and 10 feet at the patch panel side.
- Choose either 568A or 568B wiring standard before beginning. Wire all jacks and patch panels for the same wiring scheme. Don't mix 568A and 568B wiring in the same installation.
- This product is not intended to be connected directly or indirectly by any means whatsoever to interfaces of public telecommunications networks (PSTN).
- Always obey all local and national fire and building codes. Be sure to firestop all cables that penetrate a firewall. Use plenum rated cable where it is required.
- Do not disable the power grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) outlet that is easily accessible at all times.
- Disconnect the power from the product by unplugging the power cord from either the electrical outlet or the product. The AC inlet is the main disconnect for removing power to this product. For products that have more than one AC inlet, to remove power completely, all AC line cords must be disconnected.
- This product has no user-serviceable parts inside the product enclosure. Do not open or remove product cover.

CAUTION: This appliance contains an internal battery that is used for the real-time clock. This battery is not a field replaceable item, and replacement should not be attempted by a user. If real-time clock errors occur and the battery is suspected, visit http://www.avocent.com/support or contact the Avocent Technical Support location nearest you.

WARNING: For Service Personnel Only - There is a risk of explosion if the battery is replaced with an incorrect type. Dispose of used batteries according to the manufacturer's instructions.

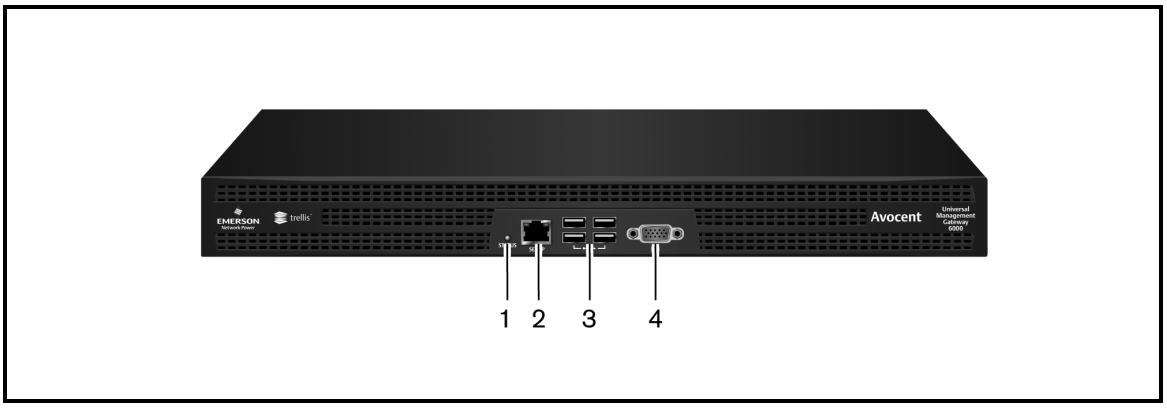
- This product is for use with other products that are Listed or Certified by a Nationally Recognized Testing Laboratory (NRTL).

Connecting the Hardware

Appliance connectors

The following figure shows the connectors on the front of the appliance.

Front of the Appliance

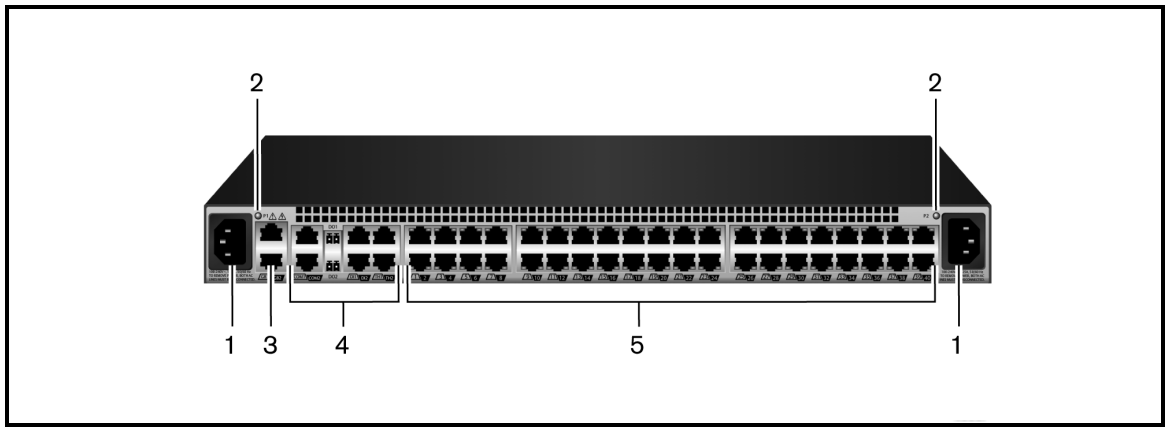


Connectors on the Appliance Front

Number	Description
1	LED
2	Console Port
3	USB Connections
4	Analog Video Port

The following figure shows the rear connectors on the appliance.

Rear of the Appliance



Connectors on the Appliance Rear

Number	Description
1	Power supplies.
2	Power Indication LED.
3	GB2 (eth1) 10/100M/1G Ethernet port. Can be connected to a second network or used for failover.
4	Sensors
5	Autosensing ports. On the Avocent® Universal Management Gateway 4000 and 6000 appliances, all ports are autosensing. On the Avocent® Universal Management Gateway 2000 appliance, the eight ports on the left are autosensing and the other 32 are dedicated.

Connecting targets

Service processor

Use a UTP cable to connect a service processor to either an autosensing or a dedicated port on the appliance. See Port configuration on page 50 for more information on how to set up service processors.

Serial

Use a UTP cable and a DB-9 or DB-25 console adaptor, as needed, to connect a serial target to an autosensing port on the appliance.

The appliance supports both the Avocent and Cisco® serial port pinout configuration. The port will autosense the pinout.

To connect serial devices and PDUs:

Make sure the crossover cable used to connect a device has the same pinout type that is configured in the software for the port (either Avocent or Cisco).

1. Make sure the devices to be connected are turned off.

2. Use a UTP crossover cable to connect the devices to the appliance, using an adaptor, if necessary.

NOTE: To comply with EMC requirements, use shielded cables for all port connections.

WARNING: Do not turn on the power on the connected devices until after the appliance is turned on.

To daisy chain PDUs to the appliance:

NOTE: This procedure assumes you have one PDU connected to a port on the appliance.

1. Connect one end of a UTP cable with RJ-45 connectors to the OUT port of the connected PDU.
2. Connect the other end of the cable to the IN port of the chained PDU. Repeat both steps until you have connected the desired number of PDUs.

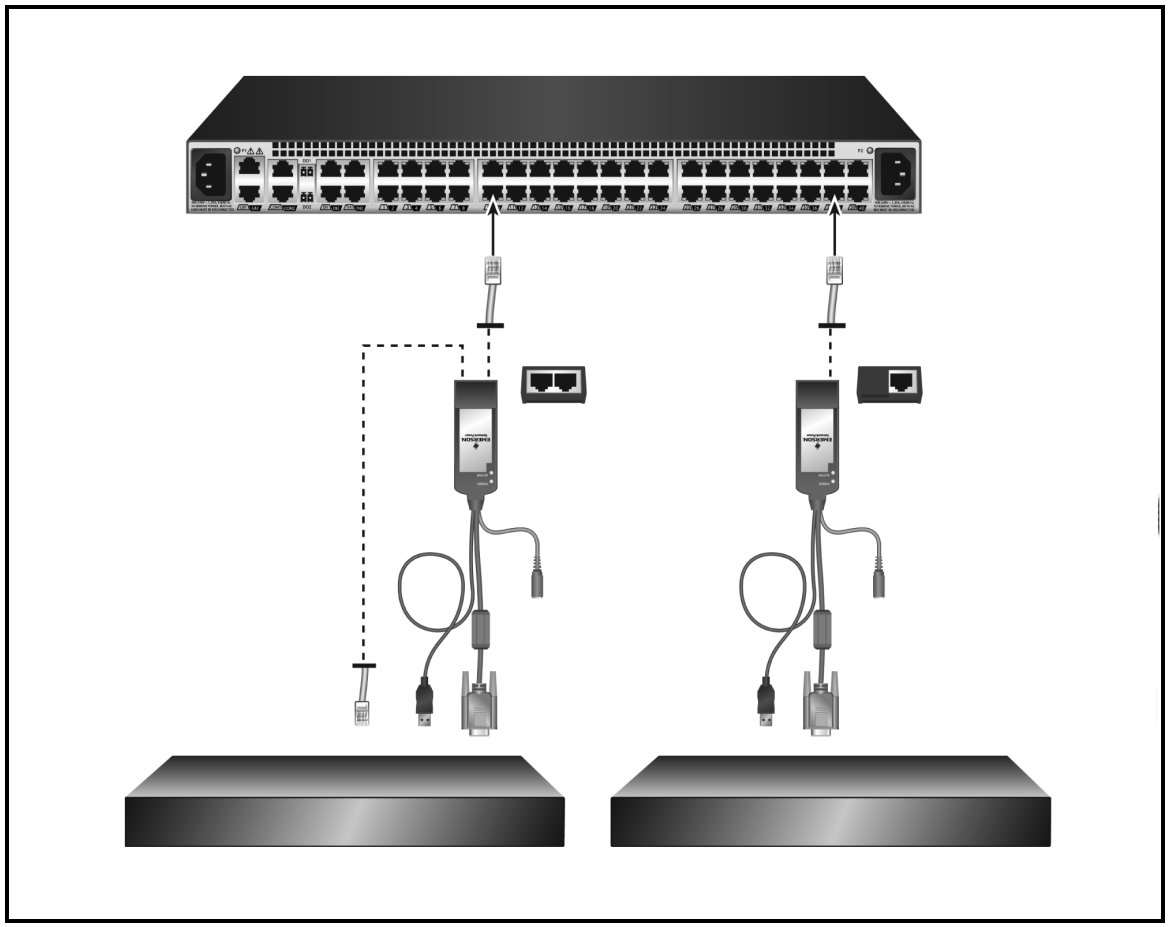
NOTE: For performance reasons,do not connect more than 128 outlets per serial port.

See Port configuration on page 50 for more information on how to set up serial targets.

KVM

If your appliance supports KVM connections, use a UTP cable and a UMIQ module to connect a KVM target to an autosensing port on the appliance.

UMIQ Module Configuration



The UMIQ-v1 module has a single RJ-45 port to connect to the appliance. The UMIQ-v2 module has two RJ-45 ports. You can connect either one to the appliance and the other to a dedicated service processor port on the server. The cable length can be up to 100 meters long.

See KVM management on page 69 for more information about KVM targets.

Turning On the Appliance

The appliance is supplied with dual power supplies.

To turn on the appliance:

1. Plug the power cables into the appliance and into a power source.
2. Turn on the connected devices.

Verifying the Connections

Front and rear panel power status LEDs

The front panel of appliance has a dual-color general status LED that may illuminate:

- The LED illuminates green when the appliance is turned on and operating normally.
- The LED blinks green when the appliance is booting.
- The LED illuminates amber if a fault condition occurs, such as power supply failure, elevated ambient temperature or fan failure. The LED will continue to illuminate amber as long as the failure persists.
- The LED blinks amber when the appliance is shutting down. Once the LED is off, it is safe to unplug the power cords.

Rear panel Ethernet connection LEDs

On the appliance, the rear panel features two LEDs where the green LED indicates Ethernet connection status:

- The solid green LED denotes an Ethernet link has been established.
- The blinking green LED denotes Ethernet activity.
- The solid amber LED denotes a target session is active.
- No LEDs illuminated denotes no activity.

Rear panel autosensing/dedicated IP port LEDs

The rear panel of the appliance features two LEDs, green or amber:

- If both LEDs are illuminated, autosensing is enabled.
- The green LED illuminates when there is a KVM or SP connection.
- The amber LED illuminates when there is a serial connection.

Configuring the Appliance

The appliance may be accessed through the CLI or the console or Ethernet ports. All terminal commands are accessed through a terminal or PC running terminal emulation software.

NOTE: To configure using DSView™ software, see the DSView™ 4 Management Software Installer/User Guide. To configure using the appliance's web UI, see Administration on page 31. To configure using Telnet or SSH, see the appliance Command Reference Guide.

To connect a terminal to the appliance:

1. Using a null modem cable, connect a terminal or a PC that is running terminal emulation software to the console port on the front panel of the appliance. An RJ-45 to DB9 (female) cross adaptor is provided.

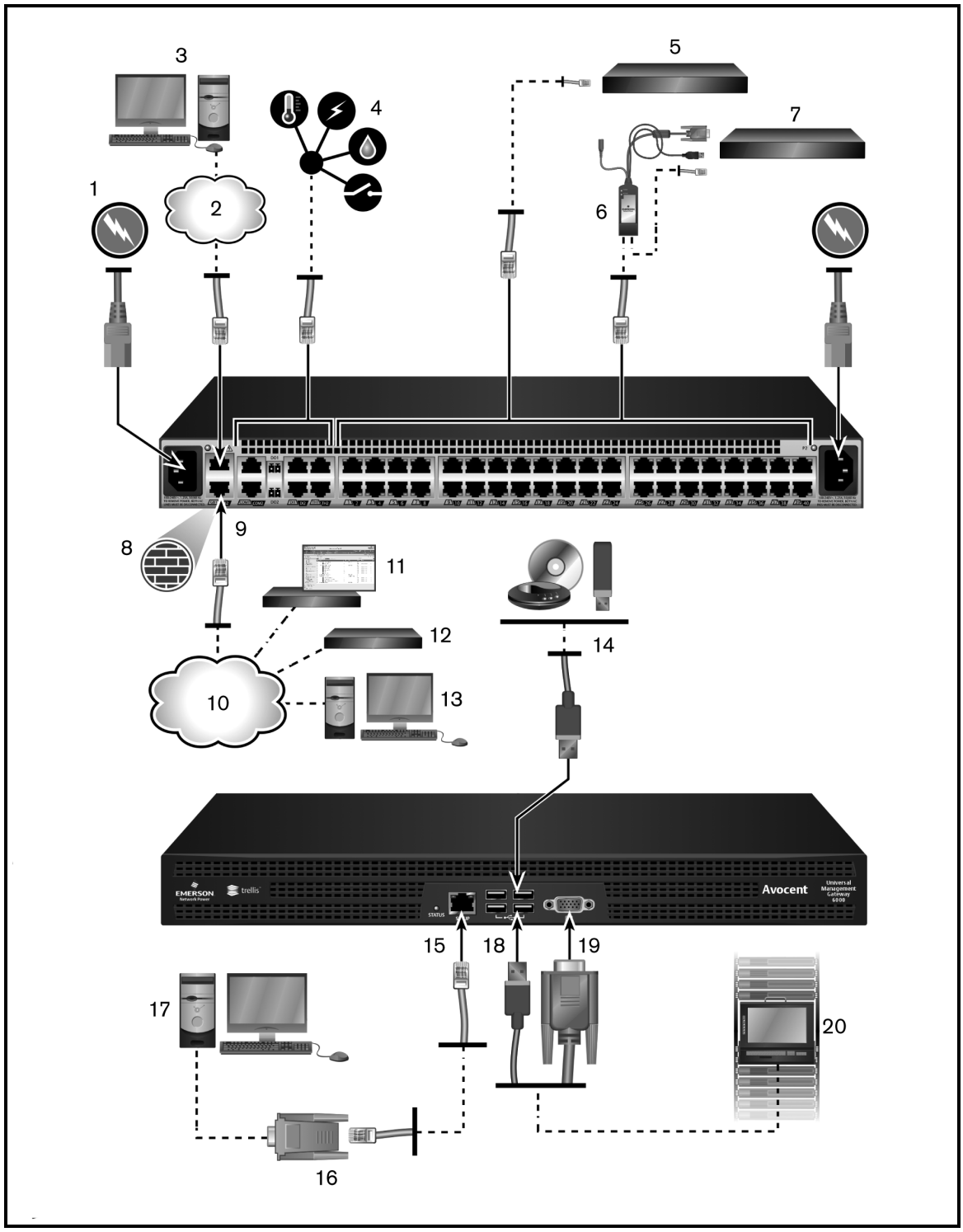
The terminal settings are 9600 bits per second (bps), 8 bits, 1 stop bit, no parity and no flow control.

2. Turn on the appliance. When the appliance completes initialization, the terminal will display the login banner plus the login prompt.

Configuration Example

The following graphic and table illustrate a typical appliance configuration.

Typical Avocent® Universal Management Gateway Appliance Configuration



Typical Avocent® Universal Management Gateway Appliance Configuration Descriptions

Number	Description	Number	Description
1	Power supplies	11	DSView server

Number	Description	Number	Description
2	Ethernet connection	12	Remote authentication
3	User	13	PC client
4	External sensors connection	14	USB media
5	Autosensing ports for serial or service processor targets	15	RJ-45 serial setup port
6	UMIQ module for KVM connection	16	DB9 com port
7	Target server (VGA/USB)	17	PC for local configuration
8	Firewall	18	USB connection (keyboard, mouse or media)
9	Ethernet connection	19	VGA console port
10	Local Area Network (LAN)	20	LCD tray for local configuration and access

Using Telnet or SSH to access a serial target

An authorized user can use a Telnet or SSH client to make a connection directly to the console of a serial target if all of the following are true.

The Telnet or SSH:

- protocol is enabled for network service in the security profile
- protocol is configured for the port
- client is available, and it is enabled on the computer from which the connection is made

To use Telnet to connect to a target through a serial port:

For this procedure, you need the username configured to access the serial port, the target name (for example, 14-35-60-p-1), device name (for example, ttyS1), TCP port alias (for example, 7001) and the hostname of the appliance or its IP address.

To use a Telnet client, enter the information in the dialog boxes of the client.

-or-

To use Telnet in a shell, enter the following command:

 # telnet [*hostname* | *IP_address*]

login: **[username]:[targetname | device_name]**

-or-

 # telnet [hostname | IP_address] TCP_Port_Alias

login: **[username]**

To close a Telnet session:

Enter the Telnet hotkey defined for the client. The default is **Ctrl + q** to quit.

To use SSH to connect to a target through a serial port:

For this procedure, you need the username configured to access the serial port, the target name (for example, 14-35-60-p-1), TCP port alias (for example, 7001), device name (for example, ttyS1), and the hostname of the appliance or IP address.

To use an SSH client, enter the information in the dialog boxes of the client.

-or-

To use SSH in a shell, enter the following command:

ssh -l [username]:[target_name] [hostname | IP_address]

-or-

ssh -l [username]:[device name] [hostname | IP_address]

-or-

ssh -l [username:TCP_Port_Alias] [hostname | IP_address]

To close an SSH session:

At the beginning of a line, enter the hotkey defined for the SSH client followed by a period. The default is **~**.

Initial Appliance Setup

The Avocent® Universal Management Gateway appliance provides extensive access to attached devices. Consider the following security parameters and default values and how they align with your organizational security policies.

The Avocent® Universal Management Gateway appliance ships with the following default settings:

- DHCP, SSH v2 and HTTPS are enabled.
- All autosensing ports are enabled.
- Ethernet and CLI Setup ports are enabled.
- The following are default user accounts within the appliance.

Default User Accounts

Username	Role	Password
admin	admin	admin
operator	power-user	operator
user	user	user

- Shell access is permitted for admin roles only.

NOTE: Avocent strongly recommends you change the default passwords after initial setup and create individual user accounts. For information on changing passwords, see Adding a user on page 41.

Connecting to Your Network

Connect a UTP cable from the primary network port to your network. For redundancy, connect both network ports and configure the fail-over network mode. For more information, see Defined networks on page 92.

Assigning an IP Address

An IP address can be obtained via DHCP, or a static IP address can be assigned.

Connecting Locally or Through the Console Port

You can configure and manage the appliance via the network from a supported web browser, via the VGA console from an LCD tray or KVM switch, or via the CLI Setup port using a serial cable and terminal emulation software. Use the provided RJ-45 to DB9F adapter to connect a terminal or workstation to the CLI Setup port. Terminal settings are: 9600, 8, N and 1 with no flow control and ANSI emulation.

NOTE: For instructions on assigning an IP address using the CLI, see the Universal Management Gateway Appliance Command Reference Guide.

The GB1 (eth0) port on the appliance is configured as a DHCP client. If your network is set up for DHCP, you must first find the IP address assigned to the appliance by looking at the DHCP leases on the network DHCP server. Then use a supported web browser to navigate to https://<appliance IP> to connect to the appliance.

NOTE: Adobe® Flash Player and Oracle® Java Runtime are required for full product support to client PCs accessing the appliance. See the release notes for a list of supported web browsers.

If your network is not set up for DHCP, the GB2 (eth1) port has a default IP address of 192.168.1.10. You can assign your PC connected to eth1 an IP address of 192.168.1.10 and then browse to the appliance using the default IP address.

To assign the IP address using the VGA console:

1. Log in to the appliance using **admin** as both the default username and password.
2. Under the Administration tab, click *Network Settings*. For more information on Network Modes, see Defined networks on page 92.

NOTE: Changes to the network mode should be performed before targets are configured. Changing the network mode after adding and configuring targets may interrupt their communication, and they may need to be added again and reconfigured in order to work again.

3. Click the entry for the desired interface in the table and change the method to Static.
4. Assign the desired IP values and click *Apply*.

Setting Up Your Network

The appliance uses IP addresses to uniquely identify itself to IP-based target devices. It supports both Dynamic Host Configuration Protocol (DHCP) and static IP addressing.

As a network infrastructure device, its IPs should be static or use DHCP reservations to ensure the appliance is always available via a consistent address. GB1 (eth0) on the appliance is a DHCP client intended only to facilitate initial network access but should be made static before being put into production environments.

An IP address can be obtained via DHCP or a static IP can be assigned using the VGA console or CLI Setup port.

NOTE: If using DHCP, you must first find the IP address assigned to the appliance by looking at the DHCP leases on the network DHCP server. Enter **https://<appliance IP>** in your browser to connect to the appliance.

To assign the IP address:

1. Log in to the appliance via its console port using **admin** as both the username and password.
2. Click the *Administration* button.
3. Click the *Network Settings* folder.
4. Click the *GB1 (eth0)* entry in the table and change the method to Static.
5. Assign the desired IP values and click *Apply*.

Firewall

Consult the following table to configure access to the appliance through a firewall.

Default Firewall Service Definitions

Port	Type	Service Definition
0	ICMP - Ping	srv-PING
20	FTP - Firmware Update	srv-FTP-Data
21	FTP - Firmware Update	srv-FTP-Commands
22	Encrypted Serial Session	srv-SSH-Serial-Session
23	Telnet Session	srv-Telnet-Session
69	TFTP	srv-TFTP-Services
161	SNMP Set/Get	srv-SNMP
162	SNMP Traps	srv-SNMP-Traps
443	Encrypted Web UI Access	srvWEB-UI
502	*Trellis*™ Platform (Modbus Communication)	srv-Modbus
514	External Syslog	srv-External-syslog
623	Serial over LAN and IPMI	NA
843	Web UI Data - Flash	srv-Adboe-Flex
1078	DSView™ Proxy Port (Default)	srv-DS-View-proxy
2068	Encrypted KVM Session	srv-KVM-session
3211	DSView™ Discovery (UDP)	srv-Discovery-protocol
3212	UMIQ	srv-DRIP-protocol
3502	DSView™ Software Appliance Communications	srv-DS-View-plug-in
3871	DSView™ Communication (ADSAP2)	srv-Security-protocol
4112	DSView™ Data Logging - Syslog	srv-Data-logging-DSView
4440	*Trellis*™ Management Protocol	srv-UMG-Service-2

Port	Type	Service Definition
6443	*Trellis*™ Platform OHS Service	srv-Trellis-Platform-OHS
7001-7040	Serial	srv-UMG-Service-9
8011	*Trellis*™ Platform	srv-UMG-Service-3
8012	*Trellis*™ Platform	srv-UMG-Service-4
8080	Java Viewer Download	srv-UMG-Service-6
8123	Web UI Data - XML	srv-UMG-Service-7
9002-9003	*Trellis*™ Intelligence Engine Event Service	srv-Trellis-Event (-2)
47777-48117	*Trellis*™ Platform	NA
50000-59999	SP Access	NA

Port requirements

- Ports 443, 843 and 8123 must be open to the appliance to support administration of the appliance using its web UI.
- Ports 2068 and 8080 must be open to support KVM sessions to a UMIQ module.
- Port 22 must be open to support serial sessions and SSH-CLI appliance administration.
- Ports 3211, 3502, 3871 must be open to support DSView™ software management of the appliance.
- Ports 502, 6443, 8011, 8012, 9002 and 47777-48117 must be open for full *Trellis*™ Real-Time Infrastructure Optimization Platform support.

Default Firewall Rules

Order	Service	Action	Use-case recommendation
1	any	Accept	Needed for internal appliance communication. Do not disable.
2	any	Accept	Needed for internal appliance communication. Do not disable.
3	srv-WEB-UI	Accept	Needed to access the appliance web UI, set to DROP to disable web UI.
4	srv-PING	Accept	Needed to test/troubleshoot network connectivity, set to DROP if not used.
5	srv-FTP-Data	Accept	Needed to upgrade appliance firmware via the web UI, set to DROP otherwise.
6	srv-FTP-Commands	Accept	Needed to upgrade appliance firmware via the web UI, set to DROP otherwise.
7	srv-SSH-Serial-Session	Accept	Needed to launch serial session or to manage the appliance via SSH.
8	srv-Telnet-Session	Accept	Option to manage the appliance via Telnet, set to DROP if not using Telnet.
9	srv-DHCPD	DROP	Don't change this default unless using DHCP Relay feature.
10	srv-DHCPD	DROP	Don't change this default unless using DHCP Relay feature.
11	srv-TFTP-Services	Accept	Not needed for current appliance features, set to DROP.

Order	Service	Action	Use-case recommendation
12	srv-SNMP	Accept	Only needed if centrally monitoring the appliance using a central SNMP server.
13	srv-External-syslog	Accept	Only needed if centrally logging the appliance using a central Syslog server.
14	srv-SNMP-Traps	Accept	Only needed if monitoring SNMP devices for the *Trellis*™ platform or managing NetPDUs.
15	srv-Adobe-Flex	Accept	Needed to access the appliance web UI, set to DROP to disable the web UI.
16	srv-DSView-proxy	Accept	Needed to access appliance targets with DSView™ software, set to DROP to disable DSView™ software support.
17	srv-DSView-plug-in	Accept	Needed to access/manage the appliance with DSView™ software, set to DROP to disable DSView™ software support.
18	srv-Data-logging-DSView	Accept	Needed to monitor the appliance with the DSView™ software, set to DROP to disable DSView™ software support.
19	srv-Discovery-protocol	Accept	Needed to discover the appliance with the DSView™ software, set to DROP to disable DSView™ software support.
20	srv-DRIP-protocol	Accept	Needed on private ports to discover and manage UMIQ modules, set to DROP to disable KVM support.
21	srv-Security-protocol	Accept	Needed to access/manage the appliance with the DSView™ software, set to DROP to disable DSView™ software support.
22	srv-PXE-boot-server	Accept	Not needed for current appliance features, set to DROP.
23	srv-Trellis-Platform-OHS	Accept	Needed for *Trellis*™ platform software management and monitoring support, set to DROP if not using *Trellis*™ platform software.
24	srv-Trellis-Event	Accept	Needed for *Trellis*™ platform software management and monitoring support, set to DROP if not using *Trellis*™ platform software.
25	srv-Trellis-Event-2	DROP	Don't change this default for any reason.
26	srv-UMG-Service-1	DROP	Don't change this default for any reason.
27	srv-UMG-Service-1	DROP	Don't change this default for any reason.
28	srv-UMG-Service-2	Accept	Needed for *Trellis*™ platform software management and monitoring support, set to DROP if not using *Trellis*™ platform software.
29	srv-UMG-Service-4	Accept	Needed for *Trellis*™ platform software management and monitoring support, set to DROP if not using *Trellis*™ platform software.
30	srv-UMG-Service-5	Accept	Needed for *Trellis*™ platform software management and monitoring support, set to DROP if not using *Trellis*™ platform software.
31	srv-UMG-Service-6	Accept	Set to DROP.
32	srv-UMG-Service-7	Accept	Needed to support KVM sessions to UMIQ modules, set to DROP to disable KVM support.
33	srv-UMG-	Accept	Needed to access the appliance web UI, set to DROP to disable the web

Order	Service	Action	Use-case recommendation
	Service-8		UI.
34	srv-UMG-Service-8	DROP	Needed only by the local host for the VGA console, Don't change this default for any reason.
35	srv-UMG-Service-9	DROP	Needed only by the local host for the VGA console, Don't change this default for any reason.
36	srv-UMG-Service-10	Accept	Needed for direct serial port access using Telnet, set to DROP in not using Telnet.
37	srv-UMG-Service-11	Accept	Set to DROP.
38	srv-UMG-Service-12	DROP	Don't change this default for any reason.
39	srv-UMG-Service-13	DROP	Don't change this default for any reason.
40	srv-Velocity-BACNet	Accept	Only needed if monitoring BACnet over IP devices for the *Trellis*™ platform, set to DROP if not using the *Trellis*™ platform.
41	srv-Modbus	Accept	Only needed if monitoring Modbus over IP devices for the *Trellis*™ platform, set to DROP if not using the *Trellis*™ platform.
42	srv-DNS	Accept	Needed to support DNS resolution, set to DROP to block DNS support.
48	srv-KVM-session	Accept	Needed to support KVM sessions to UMIQ modules, set to DROP to disable KVM support.
49	srv-KVM-session	Accept	Needed to support KVM sessions to UMIQ modules set to DROP to disable KVM support.
512	Any	DROP	Needed to protect general packet relay, not recommended to be changed

Web User Interface

Once you have connected the Avocent® Universal Management Gateway appliance to a network, you can access the appliance with its web user interface (UI). The web UI provides direct access to the appliance and its target devices via a graphical user interface.

NOTE: For instructions on accessing the appliance via the command line interface or DSView™ software see the Avocent® Universal Management Gateway Appliance Command Reference Guide or the DSView™ 4 Management Software Installer/User Guide.

Web UI Overview

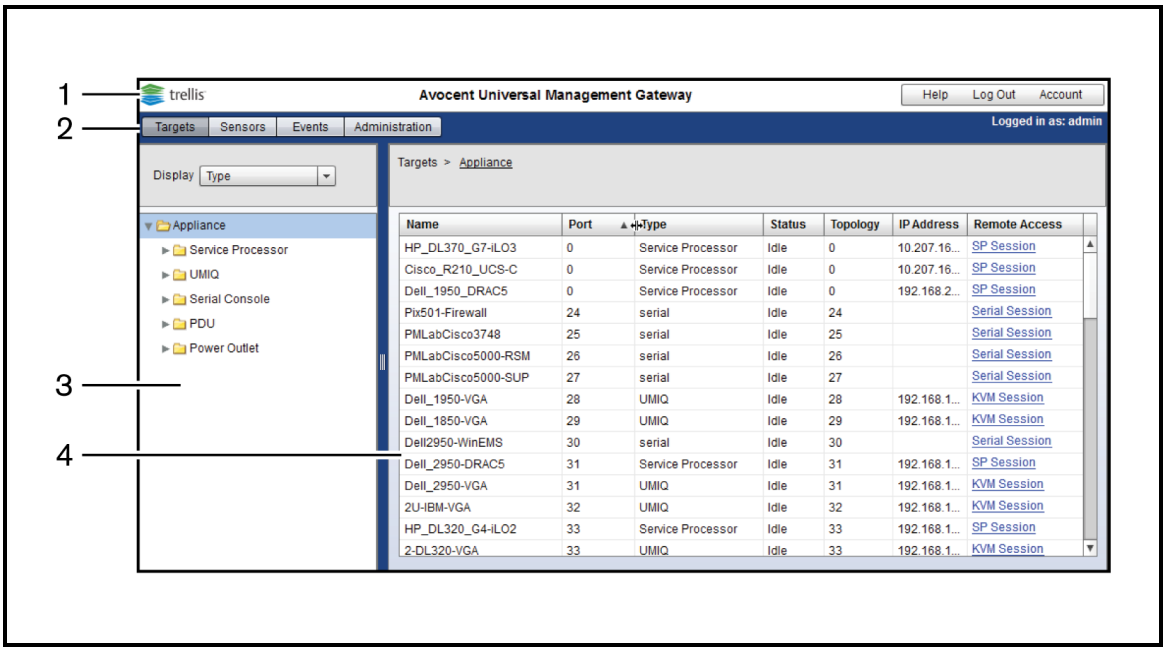
To log into the web UI:

1. Open a web browser to the address http://<appliance.IP>.
2. At the login screen, enter your username and password.
3. After logging in, you will see the Targets tab.

NOTE: When using the VGA console, you can choose alternate locales or keyboard types.

NOTE: Adobe® Flash Player and Oracle® Java Runtime are required for full product support to client PCs accessing the appliance. See the release notes for a list of supported web browsers.

Web UI



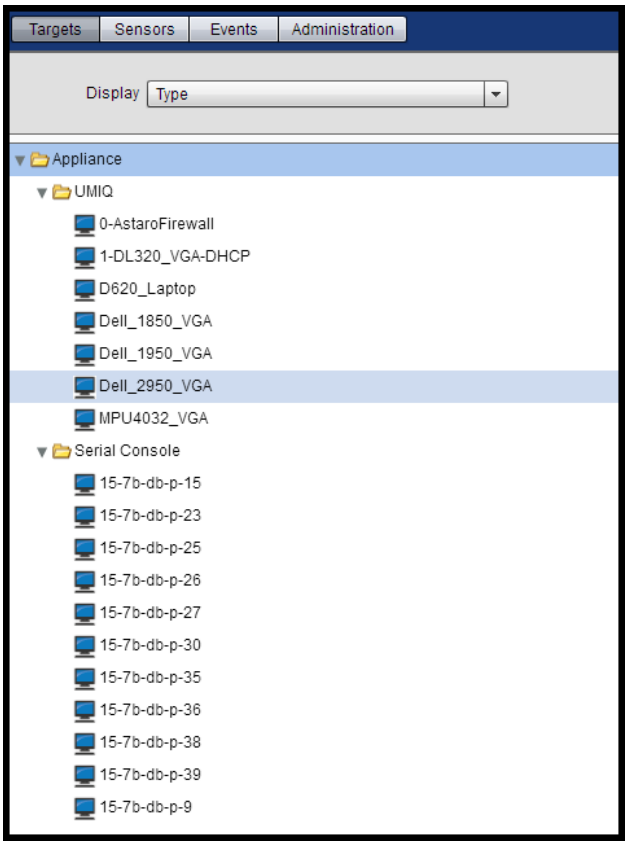
Web UI Descriptions

Number	Description
1	Title bar - Use the title bar to access the online help, log out or change the current user's password.
2	Tab bar - Use the tab bar to display and manage targets, sensors, events, administration and alerts.
3	Sidebar - The sidebar is used to display windows that specify settings or perform operations. The contents of the sidebar vary, depending on the tab bar and the window that is displayed.
4	Content area - The information specified by the tab bar, title bar and sidebar selections is displayed and changed in the content area.

Using the Sidebar

The sidebar is used to display windows that specify settings or perform operations. The contents of the sidebar varies, depending on the tab and top navigation bar selections and the window that is displayed.

Example Sidebar



Admin role

By default, Admins have access to all the tabs of the web UI. Admins can access the Targets, Sensors, Events and Administration tabs of the UI.

By default, the login and password for Admins is **admin**.

Operator role

Operators can access the Targets, Sensors and Events tabs of the UI.

By default, the login and password for Operators is **operator**.

User role

Users can access the Targets and Sensor tabs of the UI.

By default, the login and password for Users is **user**.

Tabs

The tabs are the major navigation areas of the web UI. Only certain actions can be performed in certain tabs.

Targets

The information shown in the Targets tab is primarily read-only and is intended to facilitate user access to target sessions or target control. For more information, see Targets on page 105.

Sensors

The Sensors tab is only visible on a Avocent® Universal Management Gateway 4000 or 6000 appliance. From this tab, you can view read-only information regarding temperature, humidity, dry contact, smoke, motion, leak and other supported environmental data. For more information, see Sensors and Events on page 117.

Events

The Events tab contains the event and alert logs for the appliance. The data shown on this tab is read-only except for the ability to clear event and alert entries. For more information, see Sensors and Events on page 117.

Administration

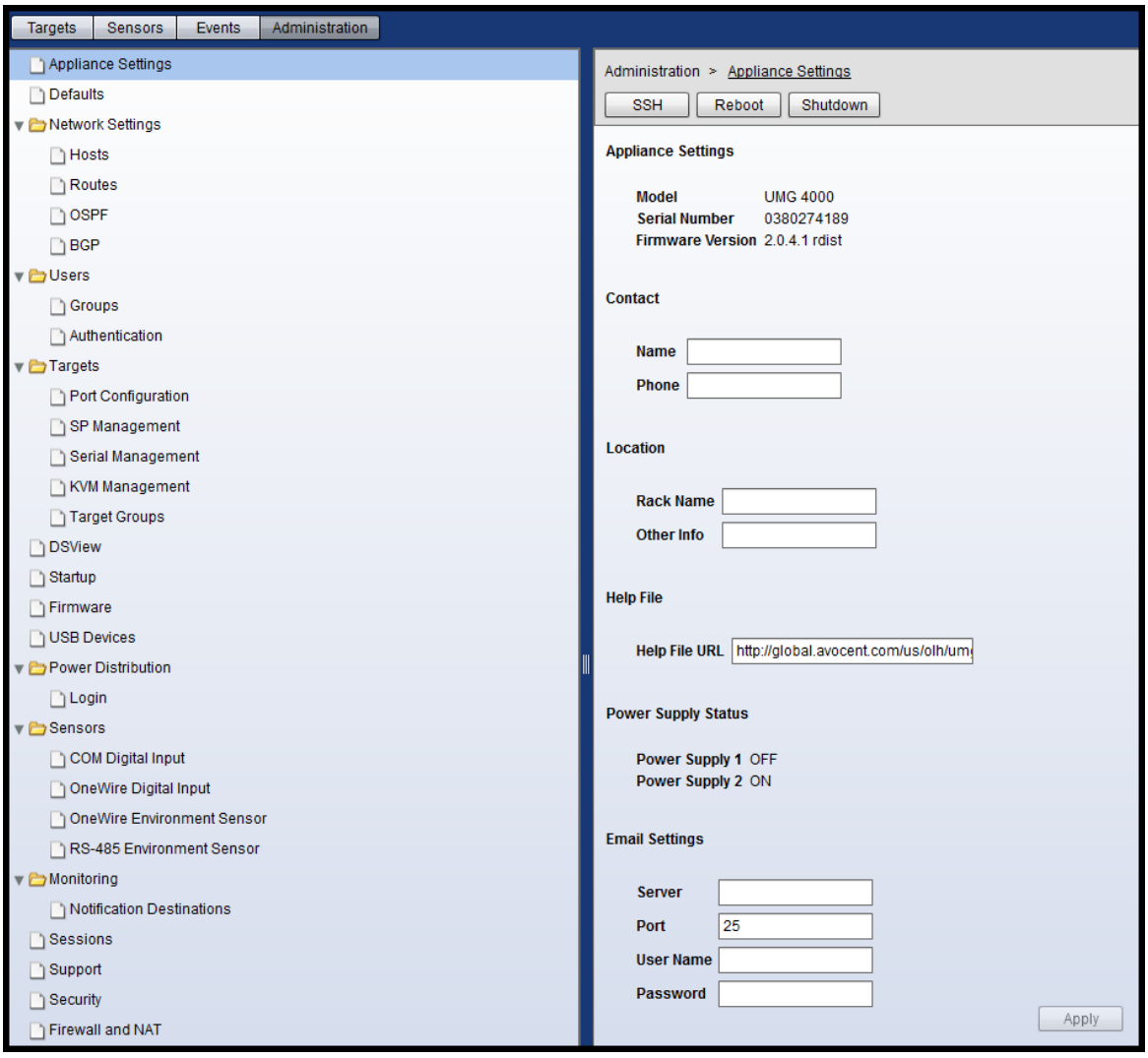
The Administration tab contains all the necessary configuration and control settings to administer and operate the appliance and its targets. The only configuration parameters not accessible from this tab are relevant to the *Trellis*™ Real-Time Infrastructure Optimization Platform's data collection and monitoring capability. That behavior is fully controlled within the *Trellis*™ platform. See the following section for more information.

Administration

When logging in as an Administrator, you will have access to the Administration tab. From this tab, you can configure and manage the appliance and its associated targets.

NOTE: The actions in this section can be performed by first clicking the *Administration* tab.

Administration Tab Overview



Appliance Settings

From the sidebar, click *Appliance Settings* to view the appliance model, serial number, firmware version and power supply status. You can enter or edit contact, location and help file settings as well as configure email settings.

You can use the buttons at the top of the screen to reboot, shut down or launch an SSH session to the appliance.

WARNING: Always execute the shutdown command through the web UI, CLI or DSView™ software under the Overview/Tools node before turning the appliance off, then on again. This will ensure the reset doesn't occur while the file system in Flash is being accessed, and it helps to avoid Flash memory corruptions.

SSH

Click *SSH* to launch an SSH-based CLI console session from your PC to the appliance. From here you can access the Administration CLI, target sessions and power actions, as well as access the appliance Linux Shell.

Help File

You can access the online help for the appliance by clicking the *Help* button in the top right of the screen.

If your client PCs do not have internet access, you may download a PDF of the appliance user guide and host it on an internal web server. To download the user guide, go to the following address: http://pcs.mktg.avocent.com/@@content/manual/5901071501b.pdf.

Once you've downloaded the user guide and hosted it on a server, enter its path in the Help File URL field.

Email Settings

The appliance can generate email alerts for events that occur on the appliance or its associated target devices. Once an SMTP/email server is configured, alerts can be sent to as many as four email addresses.

See the Monitoring and Notification destination sections to configure alerts and their email recipients.

Defaults

From the *Defaults* tab, you can restore the appliance to its factory default settings.

You can also configure the date and time, NTP server settings as well as setting the time zone and daylight savings. If you do not have access to an NTP server, you can manually set the date and time.

NOTE: You have to set the time on the appliance before enrolling it in the *Trellis*™ Real-Time Infrastructure Optimization platform.

Network Settings

Click *Network Settings* to configure the hostname, DNS, domain name, IPv4 default gateway and IPv6 default gateway.

Network modes

The appliance provides agentless remote access and control. No special software or drivers are required on the attached servers or client.

The appliance has three physical network interfaces (eth0, eth1, priv0). Each interface has an individual MAC address and can be configured for normal or failover modes. Only the public GB1 (eth0) and GB2 (eth1) are visible to the user interface. The 40 private target ports are virtually configured to connect through the internal priv0 interface.

To configure individual ports, see Port configuration on page 50.

NOTE: Changes to the appliance network mode will invalidate default firewall rules and can interrupt communication with the appliance. See below for more information.

Placing the appliance into Failover mode or adding eth0 or eth1 to a Bridge group will disable the IP addresses currently assigned to some/all appliance interfaces. New interfaces will be activated (Failover = bond0, Bridge group = <group name>). By default, the new interface will not inherit any former IPs assigned to either eth0 or eth1. For best results when placing an appliance in Failover mode or creating a Bridge group, the operator should perform the configuration changes via the VGA console or the serial Setup port to avoid losing communication access to the appliance. All firewall rules that reference interfaces replaced during the network configuration change should be edited to ensure proper network communication when operating the appliance in the new mode. (i.e. eth0/eth1 must be replaced with bond0 where applicable).

NOTE: The default IP addresses for the appliance are: GB1 (eth0) = DHCP, GB2 (eth1) = 192.168.1.10

Normal

In Normal mode, the public interfaces and the public target ports are separated by a firewall. GB1 and GB2 function independent of each other and can assume individual IP addresses. Only a single gateway can be defined for the appliance, but static routes are helpful for enabling the appliance to communicate with various subnets from either interface.

For example: An appliance with GB1 connected to a 192.168.200.x/24 network with a gateway of 192.168.200.1. GB2 is connected to a 10.1.0.x/24 network with a gateway of 10.1.0.1. If the default gateway for the appliance is set to GB1 (eth0), then the appliance will not be able to communicate

with other 10.x.x.x networks via the gateway assigned to GB2. A static route can be added to the appliance indicating that 10.1.0.1 should be used to communicate with all 10.x.x.x subnets.

Failover

In Failover mode, the GB1 and GB2 interfaces are both activated and each has a unique MAC address but they share a common bond0 virtual interface. Only a single MAC exists for the shared bond0 interface and only a single IP can be assigned to bond0. When data needs to be sent from the appliance, only GB1 will send it using the bond0 MAC/IP. When traffic is sent to the bond0 MAC/IP, only GB1 will receive it, since only GB1 is responding to ARP requests using the bond0 MAC. If GB1 is disconnected, then GB2 assumes control of the bond0 MAC/IP for all data exchange.

To configure a network device:

1. From the sidebar, click *Network Settings*.
2. Enter the hostname (the hostname will be used for e-mail notifications as the sender address).
3. Use the drop-down list to select Normal or Failover for the mode.
4. Enter the primary and secondary DNS addresses in the appropriate fields.
5. Enter the domain name.
6. Use the drop-down lists to select the IPv4 and IPv6 default gateways.
7. Click the name of the interface to modify it.
    a. Under the IPv4 heading, enter the MTU, address, netmask, broadcast and gateway in the appropriate fields. Use the drop-down list to select either DHCP or static for method.
    b. Under the IPv6 heading, enter the address, netmask and gateway in the appropriate fields. Use the drop-down list to select either DHCP or static for method.
8. Click *Apply*.

Bridge Group Configuration

An administrator can choose network interfaces to bridge together into a logical bridge group. This feature simplifies the creation, deletion and maintenance of bridged interfaces. You can bridge both physical and virtual interfaces, and bridging supports user-created interfaces as well as the pre-defined ones.

A bridge group can be created for each virtual and physical interface defined on the appliance. When a bridge group is created, it will be assigned a Layer 3 IPv4/IPv6 address. When interfaces are added to a bridge group, a prompt will be displayed, indicating that all IP addresses assigned to

the interfaces will be lost and communication with devices accessible through the ports within the bridge group will occur via the bridge group's IP address.

Appliance interfaces placed into a bridge group will not support DHCP services to prevent conflict with other DHCP services on the network. The appliance will also not support UMIQ modules connected to bridged interfaces.

The appliance is not intended to be a general purpose ethernet bridge. The port bridging feature is intended to make devices, which are physically connected to private interface ports, accessible via the public network infrastructure. In order to prevent a switching loop when multiple bridged interfaces are accidentally connected to the same network switch, the Spanning Tree Protocol (STP) feature is enabled by default for all bridge groups.

If the appliance is connected to a network switch with an active Bridge Protocol Data Unit (BPDU) Guard, the STP feature must be disabled for the bridge group.

NOTE: Disabling STP will cause the appliance to store and forward ethernet frames between the ports of the bridge group without any switching loop prevention.

To create or edit a bridge group configuration:

1. From the sidebar, click *Network Settings*.
2. Under the Bridge Group Configuration heading, click *Add*.

   -or-

   Click on an existing bridge group to edit it.
3. Enter a name for the bridge group.
4. Ensure STP is enabled.
5. Use the drop-down menu to enable the Bridge State.
6. From the list of available bridge interfaces, select the interfaces you want to add to the group and click the right arrow.
7. Under the IPv4 heading, enter the Maximum Transmission Unit (MTU) and use the drop-down menu to select either *DHCP* or *Static* routing. If using Static, enter the Address, Broadcast and Gateway.

   -or-

   Under the IPv6 heading, enter either DHCP or Static routing. If using Static, enter the Address and Gateway. Click *Apply*.
8. Back on the main Network Settings page, change the IPv4/IPv6 default gateway to the name you assigned to the bridge group. Click *Apply*.

To delete a bridge group configuration:

1. From the sidebar, click *Network Settings*.
2. Under the Bridge Group Configuration heading, check the box next to the name of the bridge group you want to delete, then click *Delete*.

Hosts

An administrator can configure a table of host names, IP addresses and host aliases for the local network.

To add a host:

1. From the sidebar, select *Network - Hosts*.
2. Click *Add* to add a new host.
3. Enter the IP address, hostname and alias of the host you want to add, then click *Apply.*

To delete a host:

1. From the sidebar, select *Network - Hosts*.
2. Click on the name of the hostname you want to delete, then click *Delete*.

Routes

Proper routing will ensure that traffic flows from clients to the appliance and back. The routing table in the appliance shows the networks that are connected as well as networks the appliance has been told about or have been learned dynamically. If traffic is destined for a remote network but the appliance cannot find a specific route matching the destination network, it will revert to sending the traffic to its default gateway. This is why some traffic does not get sent or received as expected.

NOTE: The appliance is specially designed for managing and providing access to device management consoles. It is not supported as a general purpose router, switch or packet filter.

Static routes to specific network destinations can improve the accuracy of the decisions made by the appliance about which interface to use when sending traffic.

NOTE: It is important to ensure there is never a duplicated network address assigned to more than one interface within the appliance. It is also important to change the default private network addresses within the appliance if they conflict with networks already present within your infrastructure.

To add static routes:

1. From the sidebar, select *Network Settings - Routes.* Any existing static routes are listed with their Destination IP/Mask, Gateway, Interface and Metric values shown.
2. Enter the destination IP, gateway and netmask values in the appropriate fields, then use the drop-down menu to select the device interface.
3. Click *Add*.

To delete a static route:

1. From the sidebar, select *Network Settings- Routes*.
2. Click on the name of the static route you want to delete, then click *Delete*.

OSPF and BGP

The appliance supports Open Shortest Path First (OSPF) and Border Gateway Protocol (BGP) routing standards and their associated configurations. An administrator can add, edit and delete OSPF and BGP networks.

OSPF

In order to use OSPF, an administrator must first configure the appliance ID, interfaces and networks settings. By default, OSPF speaks to all interfaces on the appliance. An administrator cannot add an interface but may change the status of an existing interface.

An administrator is able to add a network for the appliance to give and receive information from other OSPF nodes within the network. When adding a network, it must be unique to the appliance. The network value is in CIDR format of an IP address/netmask, for example: 10.12.1.0/24.

To configure OSPF:

1. From the sidebar, click *Network Settings - OSPF*.
2. Check the box to enable OSPF.

NOTE: When OSPF is enabled or disabled, an alert will be sent to the alert manager.

3. Enter the appliance ID, then click *Apply*. The appliance ID should be an IP address, but it can be any arbitrary 32-bit number. The appliance ID must be unique within the entire OSPF domain.
4. Use the drop-down menus to set the Interfaces to either Active or Passive. OSPF will not speak to any interface set to Passive.
5. To add a network, enter the address for the network and its area, then click *Add*.

6. To edit an existing network, check the box next to the network under the Modify an OSPF Network heading. When finished, click *Apply*.
7. To delete a network, check the box next to the network, then click *Delete*.

BGP

BGP is one of the key protocols used to achieve internet connection redundancy. BGP appliances use TCP protocol on port 179 to communicate with each other. BGP sends only incremental updates containing the routing entries that have changed since the last update.

BGP peers are established by manual configuration between appliances to create a TCP session on port 179. Every 30 seconds, a BGP speaker will send keep-alive messages to maintain the connection. Each BGP appliance maintains a separate TCP session with other BGP appliances to which it is connected.

An Autonomous System (AS) is a group of IT networks run by one or more network operators with a single, clearly defined routing policy. When exchanging routing information, each AS is identified by a unique number. The 16-bit number range is from 0 to 65535. From 64512 to 65535 is reserved for private use. Exterior routing protocols such as BGP are used to exchange routing information between Autonomous Systems. An AS will normally use some interior gateway protocol to exchange routing information on its internal networks. The network value is in CIDR format of an IP address/netmask, for example: 10.12.1.0/24. The configured network will be announced to all its neighbors.

To configure BGP:

1. From the sidebar, click *Network Settings - BGP*.
2. Check the box to enable BGP.

NOTE: When BGP is enabled or disabled, an alert will be sent to the alert manager.

3. Enter the AS number and appliance ID, then click *Apply*. The appliance ID should be an IP address, but it can be any arbitrary 32-bit number.
4. To add a network, enter the address for the network then click *Add*.
5. To edit an existing network, check the box next to the network under the Modify a BGP network heading. When finished, click *Apply*.
6. To delete a network, check the box next to the network, then click *Delete*.
7. To add a neighbor (peer), enter its IP address and remote-AS number then click *Add*.

NOTE: The default AS number is 64512, which is a private AS number. You will need to modify it when using BGP to make sure it's unique in the network.

8. To edit an existing neighbor, check the box next to the neighbor under the Modify a BGP neighbor heading. When finished, click *Apply*.
9. To delete a neighbor, check the box next to the neighbor, then click *Delete*.

Network Share

The appliance supports the ability to upgrade multiple SPs through network share. An administrator can configure the network share by clicking *Network Settings - Network Share* from the Administration sidebar.

To configure a Samba client for network share:

1. From the sidebar of the Administration tab, click *Network Settings - Network Share*.
2. Under the Settings tab, in the External Samba Server field, enter the IP address or hostname of the Samba server.
3. In the Share Path field, enter the subdirectory that represents the network share.

NOTE: The field may be left empty to represent the root directory.

4. In the Domain Name field, enter the name of the Windows domain name of the server.
5. Enter the username and password for the network share in the appropriate fields.

To view the contents of the root directory of the network share, click the *Contents* tab.

Users

Access to ports can be optionally restricted, based on authorizations that an administrator can assign to custom user groups. Groups can also be authorized to manage power while connected to devices. The appliance has three default users (admin, operator and user) and three pre-defined user roles(appliance administrator, power-user and user).

User role group

A user role defines the view and what the user can do within the web UI and CLI, regarding appliance settings and administration.

User Roles

User Role	Description
User	Target access only.
Power-User	View appliance information, reboot appliance, disconnect user sessions, target access, target power operations and view data logs.
Appliance-Admin	All user and administrator functions including upgrading the appliance, configuring appliance settings and target access. The Appliance-Admin role is the only one with shell access.

Users group

A user account must be defined for each user on the appliance or on an authentication server. Only an admin can add and configure other user accounts. Each local user account is assigned to one or more of the user groups.

CAUTION: Change the default passwords before you put the appliance into operation.

Password Policy

The default username and password for the appliance is **admin** and **admin**. An administrator may configure global password rules to all user accounts. The maximum length of a password is 64 characters. When the password policy is increased from a lower level to a higher one, all local user accounts will be flagged to change the password at next login.

In all cases, passwords will be checked to ensure they are not comprised of palindromes or repeated strings.

Password Policy Settings

Setting	Description
None	Passwords can be as short as one character and may contain any character. Passwords can be immediately re-used. Password expiration is set to never by default.
Weak	Passwords must contain at least four characters, at least one of which must be a number. When a user changes a password, it must be different from the old password. Passwords are set to expire after one year, by default.
Medium	Passwords must contain at least eight characters, including one number and one capital letter. When a user changes a password, it must be different from the old password. Passwords are set to expire after 90 days, by default.
Strong	Passwords must contain at least 16 characters, including one special character, one number and one capital letter. When a user changes a password, it must be different from the old password. Passwords are set to expire after 30 days, by default.

Preemption Levels

The preemption level of users determines whether they may interrupt or disconnect another user's KVM session with a target device. Administrators and user administrators may specify the preemption level for user accounts or user-defined user groups.

By default, the preemption level active for the user is the highest assigned value of all of the user groups to which the user belongs. Preemption levels range from 1-6, with 6 being the highest level. For example, a user or a user group with a preemption level of 6 may preempt other level 6 users or user groups, as well as those with a level 1, 2, 3, 4 or 5 setting.

User and User Group Preemption

Preemption Level	Description
6	The default level for the admin account. Only available to admins.
5	The default level for the factory operator account. Only available to operators and administrators.
4	The default level for a new local user of a KVM switch or serial console appliance.
3	The default level for the Avocent® Universal Management Gateway Appliance .
2	The default level for the user administrator user group.
1	Default for new users. The default for the Factory user account.

The preemption levels may be used in the following ways:

- User preemption level - This is the preemption level assigned to a user by an administrator. If this value is larger than the highest preemption level of the user group to which the user belongs, the value will be used as the effective user preemption level.
- Group preemption level - This is the preemption level assigned to user groups to which the user belongs. If the user is assigned to multiple user groups with different preemption levels, this will be the preemption level of the user group with the highest level. For example, if a user belongs to the appliance administrators (level 6) and users (level 1) user groups, this value will be defined as 6. If this value is larger than the highest preemption level of the user, the value will be used as the effective user preemption level.

An appliance administrator or power user may also specify a local user interface preemption level that is applied to users accessing target devices through the local interface.

Adding a user

To add or modify a user:

1. From the sidebar, click *Users*.
2. Click *Add* to create a new user. The Create User screen appears. Enter the new username and password and use the drop-down menu to define the user role (User, Power-User or Admin).

   -or-

   Click the name of a user to modify that user. The Modify User screen appears. Enter a new password for the User and use the drop-down menu to change the user role.
3. Define the preemption level.
4. Check the box if you want the password to be changed at the next login.

5. Check the box to enable the session time-out and enter the number of minutes for the time-out in the field.
6. Check the box to have the password expire and then enter either the number of days before it expires or the date it expires.
7. Check the box to warn the user the password will expire and then enter the number of days before in the field.
8. Check the box to have the password expire if the account is inactive and enter the number of days the account must be inactive before it expires.
9. Use the arrows to put the user in a group. For more information on groups, see Groups on page 44.
10. Click *Apply*.

Authentication

Authentication can be performed locally, through LDAP or a DSView™ server. The appliance also supports remote group authorizations for the LDAP authentication method.

Any authentication method configured for the appliance is used for authentication of any user who attempts to log in through Telnet, SSH or the web UI.

To configure authentication settings:

1. From the sidebar, click *Users - Authentication*.
2. From the Settings tab, use the drop-down menu to select the password strength, then use the arrow buttons to select the authentication order.

NOTE: Password strength is a global setting.

3. Click *Apply*.

Authentication servers

When using an authentication server, you must configure its IP address and in most cases other parameters before it can be used. The following authentication servers require configuration: LDAP and DSView™ software servers.

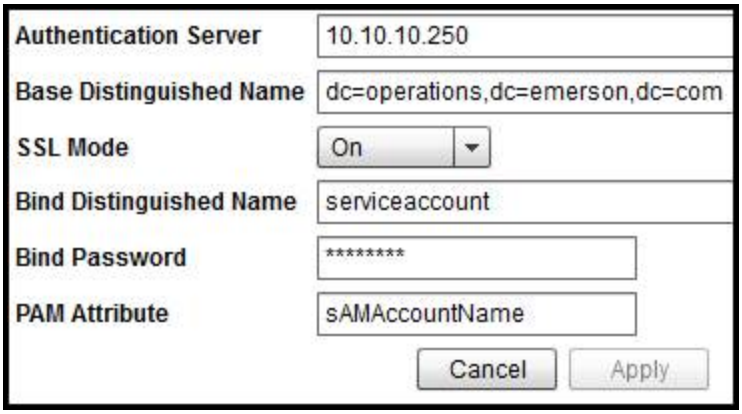
To configure an LDAP authentication server:

1. Click *Administration–Users–Authentication*.
2. Select LDAP from the Not Used column and move it to the Methods Used column.
3. Click *Apply*.
4. Select the *LDAP* tab.

5. Enter the following information:
    a. The IP address of the authentication server.
    b. The Base Distinguished Name, which is the LDAP path to the location of the user accounts.
    c. Use the drop-down menu to select Off for SSL Mode.
    d. Enter the Bind Distinguished Name, which is the service account the appliance will use to communicate with the LDAP server.
    e. Enter the Bind Password, which is the password of the service account.
    f. Enter the PAM Attribute, which is the user account attribute that will be used by the appliance to authenticate user credentials against the LDAP server.

NOTE: The PAM Attribute is case sensitive.

LDAP Configuration Example



You must now create a user group or groups in the appliance that matches a user group or group names in the LDAP directory. This will allow any user in that LDAP group to log in with uniquely assigned access permissions.

To assign LDAP user appliance/target permissions:

1. Click *Users - Groups* and create a user group with the same name as a user/security group from the LDAP directory.
2. Assign the group access to the desired targets.
3. Assign the desired permissions for the targets associated with this group.
4. Log out to test authentication with an LDAP user account.

To configure a DSView™ software authentication server:

1. Select *Users - Authentication - DSView.*

2. Enter the IP address for the DSView™ server for authentication.

NOTE: This forwards all authentication requests to the DSView™ server.

User Target Access

After creating or modifying a user, click the username and then select the *Target Access* tab to manage targets for that user. Managed targets are displayed in the column on the left. Available targets are displayed in the column on the right. If a filter is applied, only the targets matching the filter name will be displayed. If groups are defined, you can choose to display targets by group.

To add a managed target:

1. From the Available column, browse to the target(s) you want to manage and click the left arrow to add it to the managed targets.
2. Click *Apply*.

To remove a managed target:

1. From the Managed Targets column, browse to the target(s) you want to remove and click the right arrow to remove it from the managed targets.
2. Click *Apply*.

User Target Rights

After creating or modifying a user and assigning that user target access, select the username and then click the *Target Rights* tab to manage target rights.

To manage target rights:

1. Under Managed Targets, click the target for which you want to manage rights.
2. Check the appropriate box to either allow or deny general access rights.
3. For serial targets, use the drop-down menu to select the session access and check the box (es) to kill a multi-session or for multiple-session notification.
4. Click *Apply*.

Groups

User groups are given access and authorizations either by default or as assigned by an administrator. Administrators can alter the permissions and access rights of users belonging to the Power User or User groups or create additional groups with custom permissions and access rights. Administrators can add, delete or modify permissions and access rights for users from any group at any time.

For example, if an administrator configures the appliance to restrict user access to a target, the administrator can assign users to groups that are authorized for specific target access. The administrator can also authorize groups for power management and data buffer management.

This document and the software refer to users whose accounts are configured on remote authentication servers as remote users. Remote users do not need local accounts.

LDAP authentication services allow group configuration. If a remote user is configured as a member of a remote group, the authentication server provides the group name to the appliance when it authenticates the user. A local group by the same name must also be configured on the appliance. If an authentication server authenticates a remote user but does not return a group, then the remote user is, by default, assigned to the user group.

Managing user groups

Administrators can create custom user groups that contain any users. Permissions and access for custom user groups will be determined by the top-level user group permissions.

To add or modify a user group:

1. From the sidebar, click *Users - Groups*.
2. Click *Add* to create a new user group. The Create User Group screen appears. Enter the new user group name and use the drop-down menu to define the user group role (User, Power-User or Admin).

   -or-

   Click the name of a group to modify. The Modify Group screen appears. Use the drop-down menu to change the user group role.
3. Define the pre-emption level.
4. Check the box to enable the session time-out and enter the number of minutes for the time-out in the field.
5. To add users to the group, move users from the Available Users box on the left to the box on the right by selecting the name and clicking the *Add* button. You can remove any users from the group by selecting them from the box on the left and clicking the *Remove* button.
6. Click *Add*.

Appliance Administrator group

Members of the Appliance Administrator group have full administrative privileges that cannot be changed, the same access and configuration authorizations as the default admin user.

Administrators can configure ports, add users and manage power devices connected to the appliance.

NOTE: The only configuration allowed for the Appliance Administrator group is adding or deleting members.

To view admin Appliance Access Rights:

1. From the sidebar, click *Users - Groups*. The Group screen is displayed, showing the three default user groups along with any groups that have been created.
2. Click on *Appliance Admin* under the Group Name heading. The content area will display the Members screen listing all members belonging to the admin group (default member is admin).

Power User group

Members of the Power User group have access restricted to tasks for managing only the appliance. Power users have no access to the ports or power management options, and share all of the appliance access rights as admin except for configure user accounts and shell access, which are permanently disabled for this group.

User group

Members of the user group have access to target devices, unless they are restricted by an administrator, but have no access rights for the appliance. Administrators can add appliance access rights and permissions and can add users to custom user groups to add permissions and access rights as needed. By default, all selections on the Target Access and Target Rights screens will be disabled.

NOTE: You can rename custom groups as desired. The role of the group, not the name, determines the access and rights levels.

NOTE: Target Access is the most permissive and Target Rights are the most restrictive.

Group Target Access

After creating or modifying a group, click new group name and then select the *Target Access* tab to manage targets for that group. Managed targets are displayed in the column on the left. Available targets are displayed in the column on the right. If a filter is applied, only the targets matching the filter name will be displayed. If groups are defined you can choose to display targets by group.

Target Access is the most permissive. As long as either a user, or a user's group has access, the user will have target access. The following table shows target access depending on a user's or group's access.

Group Target Access

If User Has Access	If Group Has Access	Resulting Target Access
Yes	Yes	Yes
Yes	No	Yes
No	Yes	Yes
No	No	No

To add a managed target:

1. From the Available column, browse to the target(s) you want to manage and click the left arrow to add it to the managed targets.
2. Click *Apply*.

To remove a managed target:

1. From the Managed Targets column, browse to the target(s) you want to remove and click the right arrow to remove it from the managed targets.
2. Click *Apply*.

Group Target Rights

After creating or modifying a group, click new group name and then select the *Target Rights* tab to manage target rights.

Target rights are the most restrictive. As long as both a user and a user's group has target rights, the user will have target rights. The following table shows target rights depending on a user's or group's rights.

Target Rights

If User Has Rights	If Group Has Rights	Resulting Target Rights
Yes	Yes	Yes
Yes	No	No
No	Yes	No
No	No	No

To manage target rights:

1. Under Managed Targets, click the target for which you want to manage rights.
2. Check the appropriate box to either allow or deny general access rights.

3. For serial targets, use the drop-down menu to select the session access and check the box (es) to kill a multi-session or for multiple-session notification.
4. Click *Apply*.

Manage Target Settings

If you allow Manage Target Settings rights, you have rights to the following:

- Targets Tab - PDU - <PDU> - Power Consumption
- Targets Tab - PDU - <PDU> - Energy Consumption
- Targets Tab - PDU - <PDU> - Environment
- Targets Tab - PDU - <PDU> - Settings
- Targets Tab - PDU - <PDU> - Properties
- Targets Tab - PDU - <PDU> - Outlets - Lock
- Targets Tab - PDU - <PDU> - Outlets - Unlock
- Targets Tab - PDU - <PDU> - Outlets - Saved Status
- Targets Tab - PDU - <PDU> - Current
- Targets Tab - PDU - <PDU> - Voltage
- Targets Tab - Power Outlet - Properties - Settings
- Targets Tab - Power Outlet - Properties - Lock
- Targets Tab - Power Outlet - Properties - Unlock
- Targets Tab - Service Processor - <SP> - System - Power
- Targets Tab - Service Processor - <SP> - System - Enclosure
- Targets Tab - Service Processor - <SP> - System - Time
- Targets Tab - Service Processor - <SP> - Logs - Clear Log
- Targets Tab - Service Processor - <SP> - Alerts

View Logs

If you allow View Logs rights, you have rights to the following:

- Targets Tab - Service Processor - <SP> - Logs - Download Log
- Targets Tab - Serial Console - Logs
- Targets Tab - Service Processor - <SP> - Sessions - SoL Session History
- Targets Tab - Service Processor - <SP> - Sessions - SEL

Physical Receptacle Control

If you allow Physical Receptacle Control rights, you have rights to the following:

- Targets Tab - Power Outlet - <Power Outlet> - Properties - On
- Targets Tab - Power Outlet - <Power Outlet> - Properties - Off
- Targets Tab - Power Outlet - <Power Outlet> - Properties - Cycle
- Targets Tab - PDU - <PDU> - Outlets - On
- Targets Tab - PDU - <PDU> - Outlets - Off
- Targets Tab - PDU - <PDU> - Outlets - Cycle

Physical KVM

If you allow Physical KVM rights, you have rights to the following:

- Targets Tab - Appliance - Remote Access
- Targets Tab - UMIQ - <KVM switch> - Connect

Virtual KVM

If you allow Virtual KVM rights, you have rights to the following:

- Targets Tab - Service Processor - <SP> - Sessions - Virtual KVM/Media

Virtual Media

If you allow Virtual Media rights, you have rights to the following:

- Targets Tab - UMIQ - <KVM switch>

Physical Serial

If you allow Physical Serial rights, you have rights to the following:

- Targets Tab - Appliance - Remote Access
- Targets Tab - Serial Console - <serial device> - Connect

Virtual Receptacle Control

If you allow Virtual Receptacle Control rights, you have rights to the following:

- Targets Tab - Service Processor - <SP> - System - Power

View Environmental Data

If you allow View Environmental Data rights, you have rights to the following:

- Targets Tab - Power Outlet - Overview

- Targets Tab - Service Processor - <SP> - Power
- Targets Tab - service Processor - <SP> - Sensors

Access Service Processor

If you allow Access Service Processor rights, you have rights to the following:

- Targets Tab - Appliance - Remote Access
- Targets Tab - Service Processor - <SP> - Sessions - SoL Session
- Targets Tab - Service Processor - <SP> - Sessions - Telnet
- Targets Tab - Service Processor - <SP> - Sessions - SSH
- Targets Tab - Service Processor - <SP> - Sessions - SSH-AutoLogin
- Targets Tab - Service Processor - <SP> - Sessions - Browser Session
- Targets Tab - Service Processor - <SP> - Sessions - Browser Session-Auto Login

Targets

From the sidebar, click the *Targets* folder to view a summary of the connected targets and their license information. From this screen you can rename or delete a target, or view a target's status.

To rename a target:

1. Click and highlight the target name you wish to change.
2. Overwrite the existing name with the desired name.
3. Check the box next to the new target name and click the *Rename* button at the top of the table.

To delete a target:

1. Check the box next to the target you wish to delete.
2. Click the *Delete* button at the top of the table.

Licenses

Under the licenses heading is a summary of the total SP licenses and the number of remaining licenses. The number of license available vary by model. If there are insufficient licenses to discover or add targets, you will receive a low-license warning. Targets in excess of the available licenses will be ignored.

Port configuration

An autosense port can operate in either serial or network mode. Ports configured for network mode will be assigned to a virtual interface that provides the IP communication with connected devices.

The appliance contains three preconfigured virtual interfaces named priv, kvm and spm. They have unique names and IP addresses but all share a common MAC address. By default, only the priv virtual interface is enabled and all ports in network mode are assigned to it. There is a single active DHCP range associated with the IP assigned to priv.

An administrator can create additional virtual interfaces to further separate or group IP devices by various types. For example, Dell SPs could be grouped within a single subnet behind a virtual interface named Dell and IBM SPs could be grouped within a different subnet behind a virtual interface named IBM.

Devices that are physically connected to the appliance are secured and prevented from intercommunication with other devices regardless of their virtual interface assignment. This prevents an operator who is authorized to access one device from gaining unauthorized access to the other connected devices.

The appliance can support up to 64 SP/PDU targets per each of its 40 ports. Multiple SP/PDU targets per port can be achieved by connecting to a blade chassis or by connecting to an unmanaged layer 2 switch which has targets connected.

WARNING: Do not connect a UMIQ module to anything other than a direct connection to an appliance port. Putting a layer 2 switch in between a UMIQ module and the appliance can damage or destroy the switch.

Port assignment

From the sidebar, click *Targets - Port Configuration* to view or change the mode and serial or network settings of each port.

To view or change port settings:

1. Click *Targets - Port Configuration*.
2. Select the port and click *Port Configuration*.
3. To override the autosense settings, see the following table.

Port Configuration Options

Setting	Description
Enabled	Turns the port on or off.
Serial	Sets the port to operate in serial mode.
Network	Sets the port to operate in network mode.
Auto Sense	When disabled, additional settings are configurable.
Port Class	Toggles between serial console or serial PDU.
Connection Type	Changes the serial pinout from Avocent to Cisco (and Sun).
Interface Name	Assigns the physical port to a virtual interface.

Serial Settings

From the sidebar, click *Targets - Port Configuration - Serial Settings* to view or change the default serial interface communication settings.

To configure serial mode settings:

1. For serial devices connected to a port, click *Targets - Port Configuration - Serial Settings*.
2. Select the port and click *Serial Port Setting*.
3. Use the drop-down menus to select the state, speed, parity, data-size, stopbits, flow and the serial pinout type.

NOTE: The default settings are: Speed = 9600, Parity = None, Data = 8, Stop bits = 1, Flow Control = None.

4. Click *Apply*.

Network Settings

From the sidebar, click *Targets - Port Configuration - Network Settings* to view or change the default network virtual interface communication settings.

To configure virtual interface network mode settings:

1. Click *Targets - Port Configuration - Network Settings*.
2. Use the drop-down menu to enable or disable the network interface.
3. Enter the IP address, broadcast address and MTU in the appropriate fields.
4. Click *Apply*.

NOTE: IP addresses in CIDR format will utilize a standard decimal notation address (192.168.0.1) with the subnet mask represented by the number of network bits in the mask.
(255.0.0.0 = /8, 255.255.0.0 = /16, 255.255.255.0 = /24).

To create a custom interface:

1. Click *Targets - Port Configuration - Network Settings*.
2. Under the Custom Interfaces heading, enter the name for the private interface.
3. Enter the broadcast address.
4. Click *Add*.

NOTE: If DHCP is desired, the IP address of the virtual interface should correspond to a dynamic range on the DHCP settings page. Newly created interfaces will not issue DHCP addresses until the DHCP service is restarted.

To edit or delete a virtual interface:

1. Click *Targets - Port Configuration - Network Settings*.
2. Under the Modify a Virtual Interface heading, check the box next to the private interface you want to edit.
3. Make your changes.

   - or -

   Click *Delete* to delete the interface.
4. Click *Apply*.

NOTE: A user cannot enable an interface if an IP address is empty.

DHCP Settings

From the sidebar, click *Targets - Port Configuration - DHCP Settings* to view or change the default DHCP server settings. The appliance DHCP server is required to issue IP addresses to UMIQ adapters and can be used to issue IP addresses to SPs. A dynamic range is required to issue DHCP addresses incrementally or based on MAC address reservations. The DHCP server can only operate on appliance private interface ports.

To configure DHCP settings:

1. *Click Targets - Port Configuration - DHCP Settings*.
2. Check the box to enable or disable the DHCP server.

NOTE: If using the DHCP relay option, new firewall rules will need to be created for the interface that will receive the DHCP request to permit FORWARD traffic to the external DHCP server host and back again.

3. DHCP leases are defined in days (default is 30).
4. Dynamic ranges can be added or deleted by clicking *Add* or *Delete*. Within each dynamic range, the gateway field defines the range association with a virtual interface.
5. DHCP reservations are created by clicking *Add* or *Delete* in the Assignment by MAC Address heading. The hostname is a name for the reservation. The MAC Address is the layer2 physical address of the target network card. The Fixed Address is the IP address to be issued.

The lease bindings tell you which IP addresses have been dynamically assigned to targets. It displays the range, start and end times, MAC address, hostname, port number and target device type. The lease bindings can only be cleared by deleting the dynamic range they were issued from and restarting the DHCP server. Lease times are measured in days.

NOTE: Only one range may operate on a private interface.

Advanced settings

Within the appliance shell, the /etc/dhcpd.conf file can be edited to add DHCP scope options, such as option 6 (DNS server) or option 15 (DOMAIN name).

Discovery

You can discover service processors from a variety of IP ranges within routed access of the appliance. You can specify up to 20 IP address ranges either for automatic or manual discovery. Discovered service processors are displayed in the SP Management list.

In order to discover a service processor, the SP must have an IP address belonging to the discovery range and a username and password pre-populated in the Default Users tab. The SP must be a type supported by the appliance as listed in the firmware release notes.

Whether performing a discovery, import or manually adding an SP, the appliance will always perform a capabilities discovery to determine the licensed feature set of each SP in order to display session buttons or control capabilities appropriate for what the SP will support. For example, an HP iLO without an advanced license does not support vKVM. When added to the appliance, the capability discovery will recognize the license in the iLO and will disable the vKVM session button.

CAUTION: The appliance requires most SP types to have IPMI enabled in order to be discovered or managed. Some SPs will have IPMI disabled by default, for example, iDRAC7. If the SP is physically connected behind the appliance and cannot be discovered or added due to an IPMI problem, you may manually add the SP using the generic profile. Then launch an SP Access browser session to the SP and correct the IPMI problem. Then delete the generic SP and add it using the appropriate SP profile.

Physical discovery

The appliance has a DHCP service active by default running on the priv virtual interface.

SPs physically connected to the appliance and configured as DHCP clients will be issued an IP and then queried for discovery. A DHCP scope is, by default, assigned only to the priv virtual interface and associated physical ports. The spm and kvm virtual interfaces do not have addresses assigned to them by default. To assign DHCP ranges to the spm and kvm virtual interfaces to discover and

manage certain classes of devices independently, the virtual interface must first be assigned an IP. The priv virtual interface is by default: 192.168.10.1/24.

To assign virtual interfaces IP addresses:

1. Browse to the network settings page located at *Administration - Targets - Port Configuration - Network Settings*.
2. Use the drop-down menu under state to enable the interface.
3. Enter the IP address/mask and broadcast address.
4. Click *Apply*.

The IP address (CIDR format) is sometimes referred to as prefix notation for an IP/mask combo. The IP/mask information required is the number of bits occupying the network portion of a subnet mask when displayed in binary notation. The following table is an example.

CIDR Format Example

Decimal	Binary	Prefix/CIDR	Example
255.0.0.0	11111111.00000000.00000000.00000000	/8	10.1.2.3/8
255.255.0.0	11111111.11111111.00000000.00000000	/16	172.18.1.4/16
255.255.255.0	11111111.11111111.11111111.00000000	/24	192.168.1.10/24
255.255.255.252	11111111.11111111.11111111.11111100	/30	176.23.8.1/30

After assigning the virtual interface IP addresses, new DHCP ranges can be created. It is important to ensure that the DHCP range is appropriate for the IP assigned to the virtual interface but that the range does not contain that IP (avoid potential for IP conflict). The virtual IP should be assigned as the gateway for the new range.

To create dynamic DHCP ranges:

1. Browse to *Targets - Port Configuration - DHCP Settings.*
2. Under Dynamic Ranges, click *Add*.
3. Enter the Subnet address, the start and end range, the subnet mask and the gateway.
4. Click *Apply*.

The appliance will attempt to add any SP with an assigned IP address. If the default user list contains valid SP credentials, the appliance will be able to leverage the accounts list to find matching credentials. If the appliance is able to successfully log in, the SP will appear within the targets list.

To add/edit credentials in the default users list:

1. Browse to *Targets - SP Management - Default Users*.

2. Click *Add* to add a new user.

   -or-

   Click the username to edit the user.
3. Add or edit the username and password.
4. Add or edit the description as desired.
5. Click *Apply*.

Logical discovery

The appliance supports creation of up to 20 discovery queues that can be leveraged to discover SPs on the network. The discovery ranges define a start-stop IPv4 address that the appliance will scan looking for SPs. The discovery can be run as Manual (run-once) or Automatic (runs according to defined minute interval).

If the appliance can identify the SP type and log in using credentials from the default user list, the SPs will be added to the list of targets. If the appliance cannot identify or log in to the SP, nothing will be added and you will need to either manually add it or use the Import SP feature.

To discover service processors:

1. In the navigation menu, click *Targets - SP Management - Discovery*.
2. Click *Add Range* to open the Modify Search Range screen.
3. Enter the name for the search then enter the IP addresses for the range in the From and To fields.
4. Use the drop-down menu to either manually or automatically start the search.
5. If you want to automatically discover devices on a timed interval, you can enter an interval range from 10 minutes to 30 days. Enter the time interval in dd-hh-mm (days-hours-minutes) format and click *Apply*.
6. Click *Search Range Start* to begin the discovery process.

NOTE: Rescanning the same IP range in an environment that is mostly static will consume appliance processing resources and increase network traffic unnecessarily. Automatic discovery is only recommended for dynamic environments that undergo frequent change.

To manually add an SP:

1. From the sidebar, click *Targets - SP Management,* then click the *Service Processors* tab.
2. Click *Add SP*.
3. Enter the IP address and an alias name for the SP.

4. If you want to supply a username and password for the SP, uncheck the box and type in the desired credentials. If you leave the box checked, a username and password will be found from the default users list.
5. Use the drop-down menu to select an appropriate SP profile.
6. Enter the KG in hex format (optional).
7. Use the drop-down menus to select the cipher and group name (optional).
8. Check the box if you want to enable SoL data buffering (SoL history).
9. Click *Apply*.

To import a list of SPs:

1. Create an SP file using the following format: [#]IP:Port:Username:Password:Profile. For more information, see Creating an SP File on page 125.
2. From the sidebar, click *Targets - SP Management,* then click the *Service Processors* tab.
3. Click *Import SPs*.
4. Browse to the location where the SP file is stored and click *Open*. At the Import Targets dialog box, click *OK*.
5. Once you've begun importing the list of SPs, they will populate within the list of SPs.
6. You can click *Stop Importing* to stop the remainder of the import process.

To edit an SP:

1. From the sidebar, click *Targets - SP Management,* then click the *Service Processors* tab.
2. Click the name of the SP you want to edit.
3. Under the Modify SP tab, you can edit the SP's name, username, password and, depending on the profile type, the KG, cipher, SoL data buffering and virtual KVM preference.

NOTE: You can also edit the name of an SP from the Administration-Targets screen.

4. Click *Apply*.
5. Under the SoL tab, you can enable Serial over LAN and configure the baud rate, channel package level limit and retry count.
6. Click *Apply*.

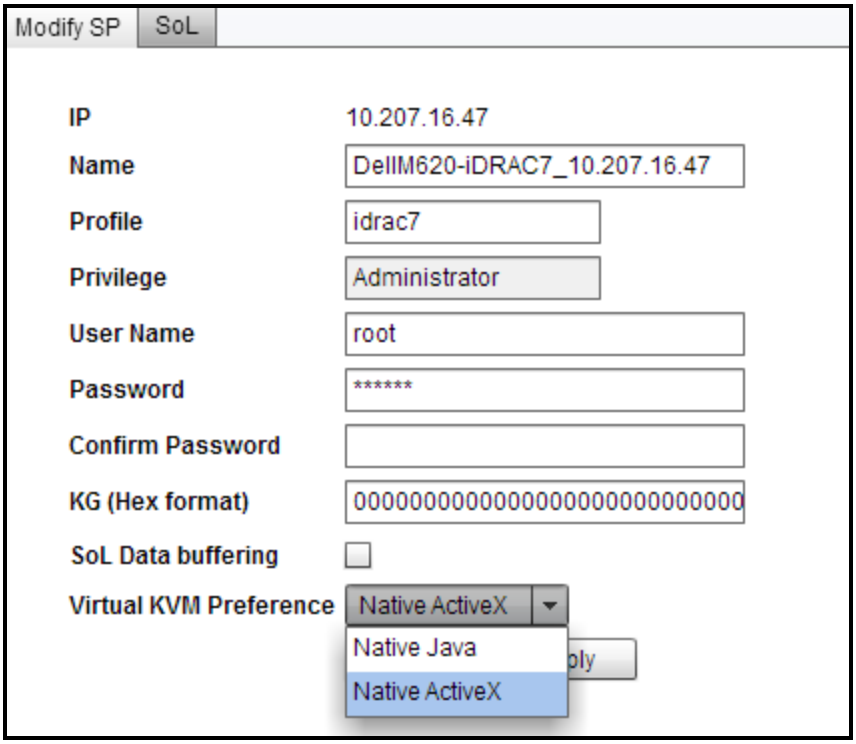
Virtual KVM

For some SPs, the appliance supports both Java and ActiveX viewers. By default, the appliance will attempt to provide the user with the ActiveX vKVM option if supported for that SP type. If ActiveX is not supported by the client browser, the appliance will only provide a Java-based

vKVM session. If you wish to change the default vKVM option and if vKVM is supported by the SP, from the Modify SP page, select whether Java or ActiveX is the preferred viewer. You can then open a session by selecting the SP from the Targets tab, by clicking the *Sessions* tab and clicking *Virtual KVM/Media*.

NOTE: Microsoft Internet Explorer is the only browser that supports ActiveX.

vKVM Preference



To remove an SP:

1. From the sidebar, click *Targets - SP Management,* then click the *Service Processors* tab.
2. In the SP list, select the SP(s) you want to remove and click *Delete*.

Generic service processors

The appliance can provide access to a generic IP based management console on any device or to an unsupported SP. The device is manually added as an SP using the generic profile.

NOTE: Credentials are not required to add a generic SP.

The appliance will perform a capability discovery to find a management console listening on TCP port 22 (SSH), 23 (telnet), 80 (HTTP), 443 (HTTPS).

After the generic SP has been added it will appear on the main Targets tab and the available session buttons will be activated to the appropriate capabilities discovered on the device.

NOTE: Sessions to generic SPs will proxy through the appliance in the same way as sessions to all other SPs.

Discovery log

The discovery log displays the results of SP add and SP discovery processes on the appliance. The log chronologically displays the status of the add/discovery steps and will automatically update as status changes occur.

To view the discovery log, from the Administration tab, click *Targets - Discovery,* then click the *Log* tab.

Discovery Log Definitions

Type	Description
Filter Options	
Method	Defines whether the SP was discovered, manually added or imported.
Credential	Defines whether default credentials were used or manually supplied.
Status	Defines whether the SP is being discovered, was successfully discovered or an error occurred during the discovery process.
Comment Definitions	
Target Added	The SP was successfully added.
No ping response	No SP is found.
Not communicating	An SP has been found but the appliance is unable to communicate with it.This is likely due to IPMI being disabled on the SP. See Discovery on page 54.
Type/credentials not found	The SP is not supported or valid credentials were not found from the Default Users list.

For a single page of the Discovery Log, an administrator can filter the results using the Method, Credential and Status drop-down menus. The columns can be sorted in ascending/descending order by clicking on the column header. The refresh button will reset to default the filter and sort options.

To filter the discovery log:

1. From the sidebar, click *Targets - Discovery*, then click the *Log* tab.
2. Use the drop-down menus to filter by Method, Credential and/or Status.
3. Click *Filter*.

NOTE: Clicking Refresh resets all the filtering parameters.

To perform advanced sorting and filtering, the Discovery Log can be exported to a .csv file by clicking *Export*.

An administrator can clear selected log entries on a single page by checking the desired boxes next to log entries then clicking *Clear Selected*. The entire Discovery Log can be purged by clicking *Clear All.*

SP management

A service processor (SP) can be connected to any numbered target port on the back of the appliance.

Service Processors that lack a dedicated interface are shared with NIC1 in what is called Side-Band. Side-Band SPs can only be communicated with logically by the appliance via your network. The SP will need to be assigned an IP that the appliance can communicate with.

Many SPs can be configured to either use the dedicated interface or share (Side-Band) with NIC1. The appliance can communicate with the SP in either implementation via IP.

When SPs are physically connected to the appliance, the IP of the SP is not accessible to your network. OEM tools will not be able to communicate with the SP unless the appliance is placed in Bridge mode. The SP manager prevents communication between its numbered target ports, but the appliance does not.

The SP Management screen displays all Service Processors (SPs) connected to the appliance. From this screen you can add, delete and manage SP settings. An SP can be manually added to the appliance if the appliance has IP access to the SP and has a corresponding profile to support the SP type. The username/password must be provided in the Add SP Wizard. Common credentials can be pre-populated in the Default Users tab. The profile you choose needs to match the SP as closely as possible.

SPs that use IPMI will use the KG (Hex format) and Cipher settings to implement a symmetric IPMI 2.0 encryption key to encrypt the UDP-based IPMI traffic. To ensure all of the SPs' capabilities are available to the appliance, make sure the SPs enable IPMI-over-LAN in their configuration. Because IPMI is sometimes customized, support for non-standard implementations will vary.

NOTE: Appliance support for each SP is dependent upon SP firmware capabilities. See the appliance firmware release notes for a complete list of SP types and supported SP firmware versions. SPs and SP versions that are not listed as supported may have some level of support if manually added to the appliance using the IPMI_2.0 or generic SP profiles. The appliance firmware and release notes can be found at http://www.avocent.com/update.

You can also add multiple SPs at once by creating a custom file containing the IP address, port, username, password and SP type of the SPs you want to add.

Once SPs are added, their information will be displayed within the table on the SP Management page.

NOTE: Users that do not have Administrator access will only see devices to which they have access.

Default Users

The appliance contains a list of default usernames and passwords that will be used when adding and discovering SPs. You can add to or modify the credentials in this list. The description can be used to identify an account. You can also delete a default user by clicking the box next to it and clicking *Delete*.

To add or modify a default user:

1. From the sidebar, click *Targets - SP Management - Default Users*.
2. Click *Add* to add a new user.

   -or-

   Click a hyperlinked user name to modify that user.
3. Enter or modify the username and password.
4. Click *Apply*.

Access settings

Access settings define the TCP ports that will be used when providing a remote user with an SP Access session (i.e. vKVM, vmedia, browser, SSH and telnet).

Multiple ports are dynamically allocated from this customizable range for each SP session. The time-out for these sessions can be configured.

For more information, see Sessions on page 107.

Firmware upgrade and repository

For supported SPs, an administrator can view and upgrade firmware as well as store firmware either locally on the appliance or remotely through the network share.

To add SP firmware to the repository:

1. From the sidebar of the Administration tab, click *Targets - SP Management*, then click the *Firmware Repository* tab. The page displays all the firmware stored in either the local or remote repository.

2. Click *Add* to add new firmware to the repository.
3. Use the drop-down menu to store the firmware locally on the appliance or remotely via the network share.
4. Use the drop-down menu to select the firmware profile and enter a firmware version or comment as desired.
5. Click *Upload*, then browse to where the firmware is stored and click *Open* to upload it.

To delete SP firmware from the repository:

1. From the sidebar of the Administration tab, click *Targets - SP Management*, then click the *Firmware Repository* tab. The page displays all the firmware stored in either the local or remote repository.
2. Check the box next to the firmware you want to delete and click *Delete*.

To view or upgrade firmware for supported SPs:

1. From the sidebar of the Administration tab, click *Targets - SP Management*, then click the *Firmware Upgrade* tab.
2. A list of connected SPs appear with the SP's name, IP address, type, current firmware version, supported firmware version, upgrade status and last result. You can sort SPs by profile by using the Profile drop-down menu and then clicking *Apply*. You can refresh the page by clicking *Refresh.*
3. To upgrade an SP's firmware, check the box next to the SP and click *Upgrade*.
4. On the Upgrade screen, check the box if you want to restore the default configuration for the SP after upgrading.
5. Use the drop-down menu to select the firmware version stored in the repository for the upgrade.
6. Check the box to schedule an upgrade for a later time and enter the desired date and time for the upgrade. Leave the box unchecked to perform an immediate upgrade.
7. Click *Continue*. You will return to the Firmware Upgrade screen and the Upgrade Status for the SP you've chosen to upgrade will change to In Progress.

Serial management

Serial targets connected to an appliance are assigned a target name and associated with an internal tty serial interface. The settings for these serial interfaces are split into two locations:

- Port Configuration - Serial Settings.

  These settings govern tty interface communication, speed, parity, flow control, etc.

- Serial Management - Serial Console Ports.

  These settings govern the handling of serial port data within the appliance.

NOTE: To rename a target, see Targets on page 50.

Serial console ports

Any autosensing port can be used to connect a serial target to the appliance. The autosensing ports support either the Avocent® or Cisco™ soft pinout modes.

To edit the CAS settings for one or more serial targets:

1. Click *Targets - Serial Management*.
2. Under the Serial Console Ports tab, click the check box for each port you want to configure.
3. Click the *Edit* button.
4. Click the CAS tab to configure the CAS settings. Click *Apply* when finished.
5. Click the Data Buffering tab to configure data buffering settings. Click *Apply* when finished.
6. Click the Alerts tab and then click *Add* to add an alerts string. Click *Apply* when finished.

NOTE: See the following table for a description of the CAS, Data Buffering and Alerts parameters.

CAS Parameters

Parameter	Description
CAS	
Port	The number of the port.
Protocol	The networking protocol that can be used to access the serial port/target. • SSH - Authorized users can use SSH to connect to the console of a connected device. • Telnet - Authorized users can use Telnet to connect to the console of a connected device. • SSH/Telnet - Authorized users can use SSH and/or Telnet to connect to the console of a connected device simultaneously. • Raw - Authorized users can make a Raw Socket connection to the console of a connected device. Default: SSH/Telnet.
TCP Port Alias	• For a Telnet/Raw session: TCP port to redirect to a serial port. For example: telnet <appliance IP>:70XX • For SSH session: Interface name (ttySxx) or target device name. For example: ssh user:<interface or target name>:<appliance IP>:22 Default: 70XX, where XX is the serial port number.
Allow Session Only if DCD is On	When the DCD is OFF, the appliance will not provide sessions for this serial port. Default: Disabled (allow access if DCD is OFF).
DTR Mode	DTR Mode can be set to the following: • Always On. • Normal - the DTR status will depend on the existence of a CAS session. • Off Interval - when the a CAS session is closed, the DTR will stay down during this

Parameter	Description
	interval. Default: Normal.
DTR Off Interval	Interval used by DTR Mode Off Interval in milliseconds. Default: 100.
Line Feed Suppression	Enables the suppression of the LF character after the CR character. Default: Disabled.
Null After CR Suppression	Enables the suppression of the NULL character after the CR character. Default: Disabled.
Transmission Interval	The interval the port waits to send data to a remote client in milliseconds. Default: 20.
Break Sequence	Sequence used to send a break signal to the serial port. Not available for Raw. Default: ~break.
Break Interval	Interval for the break signal in milliseconds. Not available for Raw. Default: 500.
Log In/Out Multi Session Notification	Enables the notification to multi-session users when a new user logs in or a user logs out. Not available for Raw. Default: Disabled.
Enable Auto Answer	When the input data matches one input string configured in Auto Answer, the output string will be transmitted to the serial port. Default: Disabled.
Enable Auto Discovery	The target name will be discovered based on the console or login prompt and will be associated with this serial port. Default: Disabled.
Enable Auto Speed Detection	The speed of the serial port will be discovered. Default: Disabled.
Note: Additional configuration operations for Auto Discovery and Speed Auto Detection are found on the CAS Profile tab.	
Data Buffering	
Port	The number of the port.
Status	Enables or disables data buffering. Default: Disabled.
Type	Displays the type of data buffering: Local - stores the data buffering file in the local file system. Syslog - sends the data to the syslog server facility **0** with severity **info**. Default: Local.
Time Stamp	When enabled, adds the time stamp to the data line for local data buffering. Default: Disabled.
Log-in/out Message	Includes special notification for logins and logouts in data buffering. Default: Disabled.
Serial Session Logging	Enabled - stores data at all times. Disabled - stores data when a remote serial session is not opened. Default: Disabled.
Alerts	
Alert Strings	Regular expression or ASCII patterns used to generate event notifications. The appliance will try to match the data received from a serial target with the configured patterns. When there is a match, an alert is sent. Default: Empty.

Data logging

If you enabled Serial Session Logging under the Data Buffering tab, you will be able to download the logged data once a serial session to the enable port has been launched.

To download logged data:

1. Click the *Targets* tab in the title bar.
2. From the sidebar, click *Serial Console* then click on the target on which you enabled data logging.
3. Click the *Logs* tab, then click *Download* Logs.

   -or-

   The log files can be accessed or downloaded from the appliance shell in the directory /log/DB.

Serial PDU ports

Autosensing ports can discover attached serial PDUs or, if autosensing is disabled, be configured for serial PDU mode. See Port configuration on page 50 to configure a port.

To configure a serial PDU port:

1. Click *Targets - Serial Management*.
2. Under the Serial PDU Ports tab, click the checkbox for each port you want to configure.
3. Click the *Edit* button.
   a. Use the drop-down list to select the PDU type.
   b. Check the box to enable speed auto detection.
   c. Configure the polling rate.
   d. Enter the power cycle interval.
   e. Use the drop-down menus to enable or disable Syslog, Buzzer and SW Overcurrent Protection.
4. Click *Apply*.

Serial rack PDU

When connecting an appliance's autosensing port to a Cyclades™ PM10/20 or Avocent® PM PDU, a straight CAT5/CAT6 cable should be connected to the In/Console port of the PM PDU.

CAS profile

From the CAS profile page, you can configure the serial console features, including the host name, auto discovery, auto speed and auto time-out.

To configure the CAS profile:

1. From the sidebar, click *Targets - Serial Management*.
2. Click the *CAS Profile* tab.
3. Under the Settings heading, enter the auto discovery timeout and probe timeout in number of seconds.
4. To add an auto answer input and output string, click *Add*. Enter a new string in the Input String or Output String fields and click *Apply*.

   -or-

   To delete an auto input and output string, select the checkbox next to the string you want to delete. Click *Delete*.
5. To change the default auto discovery time-out or probe time-out, perform the following steps.
   a. Select *Settings*.
   b. Enter a new value in the Auto Discovery Timeout and Probe Timeout fields.
   c. Select a speed from the Default Speed on Auto Discovery Failure drop-down list and Probe Speed List.
   d. Click *Save*.
6. To add a new probe or match string or delete an existing string, perform the following steps.
   a. To add a string, click *Add*, enter a new string in the New Probe String or New Match String field and click *Save*.
   b. To delete a string, select the checkbox for the string and click *Delete*.
7. Click *Apply*.

PDU management

Connected power devices can be used for remote power management. The appliance enables users who are authorized for power management to turn power on, turn power off and reset devices that are plugged into a connected PDU.

The following table displays the types of PDUs supported, the communication protocols used and the ports that can be connected.

Type	Protocol	Ports
Avocent® PM PDU (PM10/20/1000/2000/3000)	Serial	Any autosense port
Liebert® MPH/MPX/MPH2/MPX2	IP-SNMP	Any appliance port or Remote via LAN infrastructure

Serial PDUs connected to an autosense port will be automatically discovered. Serial PDUs connected to a port with autosense disabled must be manually given a port class of *Serial PDU*.

Network (IP) PDUs connected to appliance ports will be automatically discovered if the DHCP and SNMP settings are in a default state. Network PDUs can also be discovered from a remote LAN infrastructure using the SP management discovery range feature.

Network PDU

Network PDUs can be added or discovered when physically connected to appliance ports or logically accessible via IP from the rest of the LAN network.

To add a network PDU:

1. From the sidebar, click *Targets-PDU Management* then click the *Network PDU* tab.
2. Enter the IP address, community name string and use the drop-down menu to select either RO (Read Only) or RW (Read/Write) as the ComType.
3. Click *Apply*.

NOTE: A com type of RW is required to turn outlets on or off and to modify rack PDU settings. You may need to change the SNMP com type within the rack PDU's native interface and within the appliance before control actions will be supported.

To delete a network PDU:

1. From the sidebar, click *Targets-PDU Management* then click the *SNMP Settings* tab.
2. From the Network PDU table, check the box next to the network PDU you want to delete.
3. Click *Delete*.

SNMP Settings

Network PDUs can be discovered using the community information defined in *PDU Management-SNMP Settings*. By default, the appliance is pre-populated with Liebert® Rack PDU SNMP community defaults.

To add an SNMP community:

1. From the sidebar, click *Targets-PDU Management* then click the *SNMP Settings* tab.

2. Enter the community name string, use the drop-down menu to select either RO (Read Only) or RW (Read/Write) as the ComType and enter a community description.
3. Click *Apply*.

NOTE: A com type of RW is required to turn outlets on or off and to modify rack PDU settings. You may need to change the SNMP com type within the rack PDU's native interface and within the appliance before control actions will be supported.

To delete an SNMP community:

1. From the sidebar, click *Targets-PDU Management* then click the *SNMP Settings* tab.
2. From the SNMP Community table, check the box next to the community you want to delete.
3. Click *Delete*.

Serial PDUs

Serial PDUs can be added when physically connected to appliance ports.

To add a serial PDU:

1. Physically connect the serial console/IN port of the Avocent PDU to an autosensing port on the appliance.
2. The autosense port should automatically switch to serial mode and discover the serial PDU.

   -or-

   If the port doesn't auto sense the PDU, to manually enable serial mode, click *Targets-Port Configuration.*

   a. Check the box next to the port and click *Port Configuration*.
   b. Select the Serial radio button and use the drop-down menus to disable autosense, select Serial PDU as the port class and choose the appropriate connection pinout type (Avocent or Cisco).
   c. Click *Apply*.

To change a serial PDU password:

1. Select *Targets - PDU Management - Serial Login.*
2. Enter the new password and click *Apply*.

Asset Location

Asset tracking enables a user to determine the specific location of a device within a rack and also track the movement of devices into and out of the rack. The Avocent® Universal Management Gateway appliance can perform asset tracking using an external appliance such as the Data Cabinet Intelligence Module (DCIM) along with Remote Frequency Identification (RFID) tags.

RFID tags are placed on devices before they are installed in the rack. The asset-tracking appliance then monitors those devices and can relay their placement and status to a connected server or device. Multiple asset-tracking appliances can be added to the Avocent® Universal Management Gateway appliance.

To enable asset tracking:

1. Log into the Avocent® Universal Management Gateway appliance web UI as an administrator.
2. Under the Administration tab, click *Targets-Asset Location* from the sidebar.
3. Enter the IP address and name for the asset-tracking appliance then click *Add*.

The asset-tracking data will display under the Asset Location heading.

To delete an asset-tracking appliance:

1. Under the Administration tab, click *Asset Location* from the sidebar.
2. Check the box next to the appliance you want to delete, then click *Delete Selected*.

RFID tag

RFID tags are used to identify devices within the rack. The asset-tracking appliance will recognize when any tagged device is added or removed from the rack. Attach an RFID tag to each server or device in a consistent location. The tag should be placed on the side of the device, facing the reader, in the middle of the highest RU zone. When the RFID readers are turned on, they have an LED that marks the middle of the RU. The tags should be kept between five and 15 millimeters from the surface of the reader.

KVM management

The Avocent® Universal Management Gateway Appliance combines analog and digital technology to provide flexible, centralized control of data center servers and virtual media, and to facilitate the OA&M (operations, activation and maintenance) of remote branch offices where trained operators may be unavailable. KVM over IP gives you flexible target device management control and secure remote access from anywhere at anytime.

The KVM over IP functionality of the appliance provides enterprise customers with the following features and options:

- Keyboard, video and mouse (KVM) capabilites, configurable for analog (local) or digital (remote) connectivity
- Enhanced video resolution support, up to 1600 x 1200 or 1680 x 1050 (wide-screen) native from target to remote

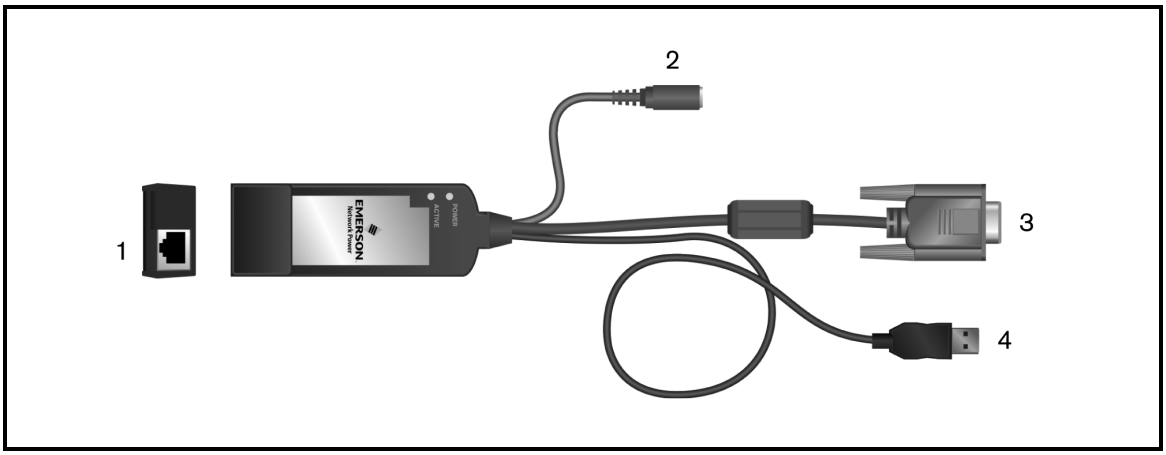
NOTE: For a full list of supported resolutions, see Video Resolution on page 136

- Virtual media capability accessed through USB ports
- Smart card capability

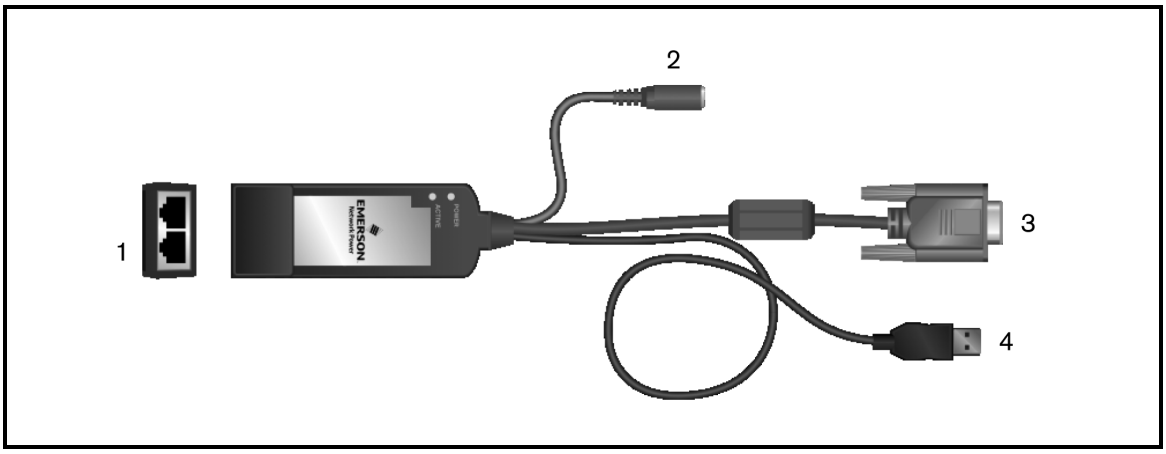
UMIQ module

An Avocent UMIQ module is an adaptor that provides traditional VGA/USB based KVM over IP support to the appliance. The module digitizes an analog VGA signal and USB signals (keyboard, mouse, mass storage, CD/DVD, smartcard-CAC) and delivers them over IP. This enables an at the rack experience for remote users no matter where they choose to be.

UMIQ-v1 Module



UMIQ-v2 Module



UMIQ Module Descriptions

Number	Description
1	Module's RJ-45 connector. The v1 module has one port used to connect to the appliance via a CAT 5 cable. The v2 module has a second port which can be connected to a dedicated SP.
2	DC power plug.
3	VGA connector for video.
4	USB connector for keyboard and mouse.

The UMIQ module has an embedded Linux OS that boots when the UMIQ module has power. The UMIQ module requires full USB bus power in order to properly operate. The DC power plug is useful for servers that do not provide sufficient power, for devices that lack USB interfaces, or for provisioning stations where the IQ module would be moved quite regularly from one server to another. As long as the UMIQ module has power from USB or DC it is considered to be at full power and it can maintain the secure IP connection with the appliance and KVM sessions with users. If the UMIQ module loses power but is still connected to the appliance, the UMIQ module will request the appliance send standby power via the UTP cable to prevent the UMIQ module from going offline.

The UMIQ module running on standby power cannot support KVM sessions, but it can maintain its connection to the appliance. The UMIQ-v2 module can maintain the bridge between its two ports ensuring that the SP is always accessible. The appliance will use the DC connector for all of its power needs and the USB plug will just be used for data exchange. The appliance draws 5v at 0.5a from either DC or USB.

When connecting an autosense port to a UMIQ module a straight UTP cable should be used. The UMIQ-v1 module has a single RJ-45 port intended to be connected to the appliance. The UMIQ-v2 module has two RJ-45 ports, either one can be connected to the appliance and the other can be connected to a dedicated service processor port on the server. The cable length can be up to 100 meters long.

WARNING: Never connect a network (switch/hub/firewall/router) between the appliance and a UMIQ module. The appliance sends electricity that will damage anything that is not a UMIQ module.

UMIQ Module LED Patterns

LED	Pattern	Description
Power LED	Constant ON	Power LED is on when the UMIQ module is operating with USB power, in a normal operating state.
	Continuous single blinks	During the upgrade, the UMIQ module will blink an LED at a rate of 2 Hz with a 50% duty cycle.
	Groups of two blinks	The UMIQ module is using standby power provided via ethernet cable from the appliance.
	Groups of three blinks	Insufficient power is provided. This may happen before the UMIQ module is enumerated by the USB host on the target server.
Active LED	Constant On	Active LED illuminated when there is an active KVM session.
	Continuous single blinks (rapid)	Used for identifying a UMIQ module, Enabled/Disabled within the appliance web UI.
	Continuous single blinks (slow)	The Active LED periodically blinks to indicate that the UMIQ module has been associated with the appliance (i.e., it has been discovered by the appliance).
Both LEDs	Continuous single blinks (rapid and alternating with the Power LED)	Alternating LED blinks at a fast rate indicate when a firmware upgrade has failed.

Devices

From the sidebar, click *Administration - Targets - KVM Management* to view each connected UMIQ module. Each column can be sorted as desired. You can view the following information for each module:

- Port - The appliance port where the module is connected. During the initial connection or a factory reset, the port number is 99 until the appliance autosenses the correct port number.
- Name - The target name assigned to the UMIQ module. Clicking this name will enable you to modify individual module settings.

NOTE: To rename a target, see Targets on page 50.

- IP Address - The IP address assigned to the module via the appliance DHCP server.

NOTE: UMIQ modules will be discovered by the appliance only after they are issued an IP address from the appliance DHCP server. This means UMIQ modules cannot be used if the DHCP server is disabled or if the port connecting the UMIQ module to the appliance belongs to a bridge group.

- EID - Displays the unique electronic ID number embedded in the module.
- Status - Displays whether the module is In-Use, Idle or Offline.

- Management - Displays whether the module is Pre-discovered, Managed or Not Managed. During the initial connection or during a factory reset, as the module is being discovered the management status will change from Pre-discovered to Managed.
- Appliance Power - Displays if the appliance is providing power to the module.
- Power Mode - Displays the power status for the module. Full means the module is getting power from the appliance and the target. Partial means that the only power is from the appliance.

Module settings

Clicking a module name will display its individual settings. For a detailed explanation of the settings, see Default settings on page 74.

Check the box to enable or disable the Flash Locator LED. When enabled, the LED on the module will flash to help you locate it in the rack.

Upgrading UMIQ modules

The UMIQ module Flash upgrade feature allows appliance administrators to update UMIQ modules with the latest firmware available.

After the Flash memory is reprogrammed with the upgrade, the appliance performs a soft reset, which terminates all UMIQ module sessions. A target device experiencing an UMIQ module firmware update may not display, or may display as disconnected. The target device will appear normally when the Flash update is completed.

UMIQ modules are automatically updated when the appliance is updated. To update your appliance firmware, see Firmware on page 80.

If issues occur during the normal upgrade process, UMIQ modules may also be force upgraded when needed.

NOTE: Check www.avocent.com for firmware upgrade files.

To upgrade the UMIQ module firmware:

1. From the sidebar, click *Targets - KVM Management* to open the UMIQ module screen.
2. Select the checkbox next to the UMIQ module you wish to upgrade, and click *Upgrade*.

CAUTION: Disconnecting an UMIQ module during a firmware update or cycling power to the target device will render the module inoperable and require the IQ module to be returned to the factory for repair.

Factory reset

After the module has been configured, you can return it to the factory default settings.

To factory reset UMIQ modules:

1. From the sidebar, click *Targets - KVM Management* to open the Appliance UMIQ screen.
2. Select the checkbox next to the UMIQ module you wish to delete, and click *Factory Reset.*

NOTE: Performing a factory reset will remove all custom settings.

Active sessions

If your model of the appliance supports KVM connections, click *Targets - KVM Management* to view KVM connections.

The following fields are displayed in the Active Sessions window:

- Session Mode - Displays the type of session. Options are normal and exclusive. Normal is an interactive session that may be shared with other users. Exclusive is a private session that does not allow sharing by other users.
- Type - Session type, which may be KVM, virtual media or serial.
- Name - The name of the target.
- User - User who initiated the session, which may be a user, a local port user or a user with a local user account.
- Duration - Current length of the console session.
- Client - IP address of the client computer connected to the session.
- EID - Displays the unique electronic ID embedded in the module.

To view or terminate active sessions:

1. Click *Active Sessions*.
2. Select the box(es) next to the session(s) you wish to terminate. Click *Terminate*.

Default settings

KVM default settings are global settings that will apply to new UMIQ modules. These settings have no effect on existing UMIQ modules. However, you can apply the default settings to existing UMIQ modules by performing a factory reset.

General

Under the General heading you have the option to delete offline modules or automatically upgrade modules. By default, both settings are disabled. For more information see Upgrading UMIQ modules on page 73.

Sharing

Under the Sharing heading, you can enable and select the level of sharing. Options include: Automatic, Exclusive and Stealth.

- Automatic is a sharing option that will automatically allow another user to share the console session. A user trying to access a console session that is already in use will not be prompted to share, they will automatically be logged into the session.
- Exclusive is a private sharing option that does not allow sharing by other users.
- Stealth is a sharing option that starts a Video Viewer window session, but you will only be able to view what occurs on the target without controlling the keyboard or mouse. The user who is currently active will not be notified that access is being shared and no request to authorize sharing will be made. If the user's preemption level is higher than or equal to yours, the stealth connection may not be permitted.

When you attempt to connect to a session already in use by another user, a dialog box states the target is not available for viewing along with the name of the current user(s). At this point, you may request to share access to the target, preempt the user or use stealth mode, if it has been enabled.

- Share a connection - When you are prompted to share a connection and you click *Share with the other user.* When sharing a target, all users may monitor and take control it if no other user is active.

  When you click *OK*, the primary user who is active will receive a request to allow sharing unless Automatic has been enabled. If the user confirms, you will be given target access.
- Preempt a user’s connection - When you are prompted to preempt the user’s session and you click *Preempt the other user*, the user requesting access to the target will be connected and existing user(s) will lose their connection to the target. The existing user(s) will be notified that their sessions have been preempted.

To display a list of users sharing their port or channel, select *View - Connected Users* in the Video Viewer window. Users in stealth mode are excluded from this display.

Encryption level

In the Encryption Level area, specify an encryption level for the keyboard/mouse, video and virtual media:

- 3DES - SSL Triple DES encryption
- 128-Bit SSL - 128-bit encryption which used an ARCFOUR (RC4®) SSL cipher
- AES - AES encryption

At least one encryption level must be specified for the keyboard and mouse. When you specify more than one SSL encryption type, the appliance negotiates the strongest algorithm that is supported by both sides. The strongest algorithm is AES, followed by 128 bit, 3DES and DES.

Session settings

Under the Session Settings heading you can configure the Input Control Timeout, enable and configure the session timeout, set the keyboard language, set the EDID (video) resolution and enable video noise control.

NOTE: If a user connects to a target with a higher screen resolution than the local computer, the Video Viewer window will display a portion of the target screen, with scroll bars for viewing the remainder of the screen. The user may view the entire screen by adjusting the resolution on the target, the local computer or both.

Session preemption

Under the Session Preemption heading, you can enable preemption and set the time-out.

Virtual media

Under the Virtual Media heading you can enable virtual media, lock to KVM session, allow reserved sessions and select the virtual media access mode.

- The locking option specifies whether a virtual media session is locked to the KVM session on the target. When locking is enabled (default) and the KVM session is closed, the virtual media session will also be closed. When locking is disabled and the KVM session is closed, the virtual media session will remain active.
- Allow reserved sessions ensures that a virtual media connection can only be accessed with your username and that no other user can create a KVM connection to that target. When the associated KVM session is disconnected, the virtual media session may be disconnected according to the Locked setting in the Virtual Media dialog box.

- The virtual media access mode allows you to set the access mode for mapped drives to read-only or read-write. When the access mode is read-only, the user will not be able to write data to the mapped drive on the client server. When the access mode is read-write, the user will be able to read and write data from/to the mapped drive. If the mapped drive is read-only by design (for example, a CD-ROM drive, DVD-ROM drive or ISO images), the configured read-write access mode will be ignored. Setting the read-only mode can be helpful when a read-write drive such as a mass storage device or a USB removable media is mapped, and you wish to prevent the user from writing data to it.

  You can have one DVD drive and one mass storage device mapped concurrently. A CD drive, DVD drive, or ISO disk image file is mapped as a virtual CD/DVD drive.

Smart card

You can connect a smart card reader to an available USB port on the client server and access an attached target on the appliance. You can then launch a KVM session to open the Video Viewer.

To view or change the default settings:

1. Click *Default Settings*.
2. Uncheck the box(es) if you want to automatically delete offline modules or automatically upgrade the modules.
3. For sharing, select the box(es) for Enabled, Automatic, Exclusive or Stealth.
4. For encryption level, use the drop-down menus to select the encryption level for Video, Keyboard/Mouse and Virtual Media.
5. For session settings:
   a. Select the Input Control Timeout from 1 to 50, with 1 representing one tenth of a second.
   b. Check the box if you want to enable session timeout.
   c. Set the Session Timeout (minutes).
   d. Select the Keyboard Language from the drop-down menu.
   e. Select the EDID Video Resolution from the drop-down menu.
   f. Check the box if you want to enable Video Noise Control.
6. For Session Preemption:
   a. Check the box if you want to allow preemption.
   b. In the Preemption Timeout field, enter the amount of time (from 1 to 120 seconds) that a prompt will be displayed to inform you that your session is going to be preempted.
   c. Check the box if you want to enable PPP.

7. For Virtual Media:
    a. Check the box(es) to enable virtual media, lock to KVM session or allow reserved sessions.
    b. From the drop-down menu, select the Virtual Media Access Mode.
8. Select the checkbox to enable Smart Card access.
9. Click *Apply*.

EDIDs

The appliance can store monitor EDIDs (extended display identification data) on connected UMIQ modules. When a UMIQ module is connected to a target server, the server will read the EDID from the UMIQ module and display video according to the resolutions defined within the EDID.

You can modify the EDID stored in the UMIQ module by selecting one of the pre-defined EDIDs or you can create a custom EDID based upon a list or imported from an EDID file.

The UMIQ module EDID options are:

- Standard
- Standard 1024 x 768
- Standard 1280 x 1024
- Standard 1600 x 1200
- Widescreen
- Widescreen 1280 x 800
- Widescreen 1680 x 1050
- Custom

Custom EDIDs

The custom option allows the appliance to pass a custom EDID . By selecting custom, you can save an EDID file from a particular monitor and assign it to a UMIQ module.

You can also load a blank EDID (all 0) to clear the DDC ESPROM on a UMIQ module. This should prevent the operating system from reading a valid EDID from the module and makes all resolutions available.

NOTE: For a list of all supported resolutions see Video Resolution on page 136.

To configure EDID settings:

1. Click *KVM Management - Default Settings*.

2. Under the Session Settings heading, use the drop-down menu to select the desired resolution.
3. Click *Apply*.
4. If using a custom setting, click the *Custom EDID* tab.
5. Select either File or List as the desired source.
   a. If you have selected File, click *Get File* and choose the appropriate file.
   b. If you have selected List, update the resolution list with the desired resolution from the dropdown menus.

NOTE: The default resolution will apply to all sessions and UMIQ modules.

6. Click Apply.

UMIQ pass through

When the UMIQ pass through is enabled, KVM sessions will connect directly to the UMIQ module IP instead of connecting through the appliance IP. This requires that firewall rule 512 be disabled and will allow IP forwarding/routing from public networks to the appliance's private networks.

The pass through mode is disabled by default. Rebooting or upgrading an appliance, or restoring an appliance image dump will not affect the status of the pass-through mode. Performing a factory restore will reset the pass-through mode to its default state.

To enable UMIQ pass through:

1. Click *KVM Management - UMIQ Pass-Through.*
2. Check the box to enable UMIQ pass through mode and click *Apply*.
3. Click *Firewall and NAT* from the sidebar. Select the box next to Forwarding Rule 512 and use the drop-down menu to change the rule state to Not Active. Click *Apply*.
4. Create a static routing rule on the client PC or on an intermediary router to direct traffic to private appliance networks.

   -or-

   Enable OSPF on the appliance to share routes to the private networks with your intermediary routers. For more information, see OSPF and BGP on page 37.

Target groups

From the sidebar, click *Targets - Target Groups*. From this screen you can create group targets. Click *Add* to create a new empty group, or select an existing group and click *Delete* to delete that group.

To modify a group:

1. Click *Targets - Target Groups* then click on the name of the group you want to modify.
2. Select one or more targets from the Available list on the right and click the left arrow to add them to the group contents.

NOTE: A filter string may be used to narrow the target list.

3. Click *Apply*.

Startup

From the sidebar, click *Startup* to display startup settings. Boot configuration defines the location from which the appliance loads the operating system. You can load the Last Known Good Configuration, which is the most recent system settings that worked correctly.

To configure boot configuration:

1. Click *Startup*.
2. Select the filename of the boot firmware.
3. Click *Apply*, then click *Reboot*.

Firmware

The appliance supports the storage of two firmware images. These images behave similar to different OSs on a dual-boot system that combines the OS and configuration. When upgrading the firmware from the DSView™ management software or the web UI, the appliance will copy the active configuration into the new firmware image slot and combine them with the new firmware OS.

After installing the new image file, the appliance will reboot to the second firmware image slot. The configurations in image slot 1 and 2 are the same, but all subsequent changes will only be made into the currently booted image. If you experience issues with the new firmware image, you can reboot to the older image.

As the firmware is upgraded, the oldest image will be overwritten with the new firmware.

From the sidebar, click *Firmware* to view the current firmware version, upgrade to the latest version, back up or delete the firmware.

To download the appliance firmware:

1. From http://www.avocent.com, browse to the product updates section and find the firmware for your Avocent® Universal Management Gateway appliance.
2. Save the new firmware to a /tmp directory.

Upgrading the firmware from the web UI can take from 90 minutes to two hours. During this time, the appliance will appear to be offline. If the session times out during the upgrade, the upgrade will be canceled. For this reason, it is recommended you first disable the session time-out before upgrading the firmware.

To disable the session time-out:

1. From the sidebar, click *Users*.
2. Click on the user performing the upgrade.
3. Uncheck the Session Times Out box.
4. Click *Apply*.

To upgrade firmware:

1. From the sidebar, click *Firmware* then click *Upgrade*.
2. Browse to the /tmp directory where you saved the downloaded firmware. Click *OK* in the confirmation box.
3. A progress bar shows the status of the upgrade. The appliance will reboot as it processes the update.

When booting the appliance in the future, both the old and new firmware will appear on the startup screen. The appliance will boot from the image defined on the startup page of the web UI.

Backing up firmware

An administrator can create a backup image of the appliance's firmware and configuration. During image creation, no changes should be made to the configuration. Upon completion, the appliance will reboot. The backup image will reside inside the appliance but must be downloaded before it can be used. See Booting from the Network on page 124 for Netboot restoration steps.

To back up the appliance firmware:

1. Under Image Management, enter an Image name.
2. Click *Create Backup Image* and click *OK*.

NOTE: The appliance can only store one image at a time.

To delete an image:

Check the box next to the image you want to delete and click *Delete Image*.

USB Devices

From the sidebar, click *USB Devices* to view the name, type, information and status of any connected USB devices. You can also enable or disable all USB ports on the appliance as well as eject any devices so that they can be shut down properly.

To mount a USB Mass Storage device:

1. Click *USB Devices.*
2. Check the box next to the device and click *Start*. When the status of the device has changed to Do not remove, the device will be mounted on /media/usbhd-port1-4 directory.

To unmount a USB Mass Storage device:

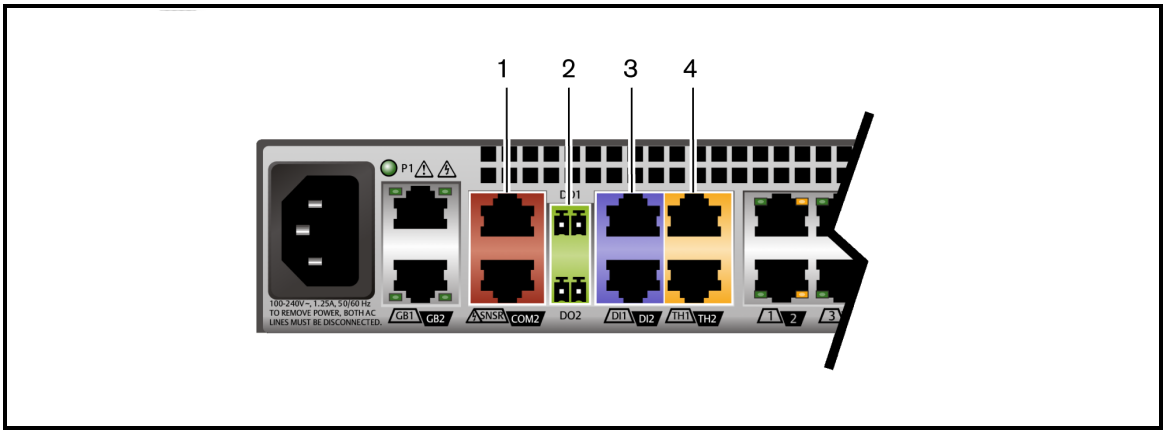
1. Click *USB Devices.*
2. Check the box next to the device and click *Stop*. When the status of the device has changed to Safe to remove, it is safe to remove the device.

Sensors

Sensor ports are located on the back of the appliance and are used to collect data from supported sensors. Sensors are not automatically detected and must be manually added and enabled. To view the status on the sensors, click *Sensors*.

NOTE: Some appliance models do not include sensor ports.

Sensor Ports



Sensor Ports

Number	Name	Type
1	SNSR/COM2 (RS-485)	Temperature, Humidity and Water

Number	Name	Type
2	DO2 (Digital Output)	Buzzer, Beacon and Door Lock
3	DI1/DI2 (Digital Input)	Vibration, Smoke, Leak, Door and Motion
4	TH1/TH2 (1-Wire)	Temperature, Humidity and Dry Contacts

The following table displays the data that can be collected.

Environmental Measurements

Measurement	Units
Temperature	Celsius/Fahrenheit
Humidity	% RH
Door Status	Active/Inactive
Leak Status	Active/Inactive
Motion Status	Active/Inactive
Vibration Status	Active/Inactive
Smoke Status	Active/Inactive

Com Digital Input

The COM digital input (DI) sensors view and monitor motion and smoke. They can be connected to the DI1/DI2 ports on the back of the appliance.

COM Sensor Properties

Property	Description	Default Value
Sensor #	Sensor ID (Read Only)	System Defined Value
Enabled	Enable or Disable	Enabled
Name	Name of the sensor	Sensor ID
Type	Smoke, Door, Leak or Motion. Sensor type can only be selected when the sensor is added.	Smoke
Default State	Open or Closed	Open
Location	The sensor's location or position	Blank

To add, enable or remove a COM digital input sensor:

1. Click *Administration - Sensors - COM Digital Input.*
2. Enter the name of the sensor.
3. Select the port (DI1 or DI2).
4. Select the type of sensor and click *Add*.
5. Click the sensor name, choose the normal status and click *Enable*.
6. To remove the sensor, click the sensor name and click *Remove*.

Digital inputs

The digital inputs collect smoke, leak and motion data. They can be connected to the DI1/DI2 ports on the back of the appliance.

Digital Input Properties

Property	Description	Default Value
Sensor #	Sensor ID (Read Only)	System Defined Value
Enabled	Enable or Disable	Enabled
Name	Name of the sensor	Sensor ID
Default State	Closed or Open	Open
Location	The sensor's location or position	Blank
Type	Type of sensor: Custom, smoke, leak or motion	Custom
Address	The serial number of the sensor (Read Only)	Information from Sensor

To detect, enable/disable or edit a OneWire digital input sensor:

1. Click *Administration - Sensors - Digital Input*.
2. Click *Detect* to search for new sensors.
3. Click the sensor number, choose the type of sensor or update the normal status.
4. Click *Enable* to enable or disable the sensor.

Environment

Environment sensors collect temperature and humidity data. They can be connected to the TH1/TH2 ports on the back of the appliance.

Environment Sensor Properties

Property	Description	Default Value
Enabled	Enable or Disable	Enabled
Name	Name of the sensor	Sensor ID
Type	Temperature or Humidity (Read Only)	Temperature
Address	The serial number of the sensor (Read Only)	Information from Sensor
Location	User defined location of the sensor	Blank

To detect, enable/disable or edit an environment sensor:

1. Click *Administration - Sensors - Environment Sensor*.
2. Click *Detect* to search for new sensors.
3. Click the sensor number and then click *Enable* or *Disable* to enable or disable the sensor.

RS-485 environment sensor

RS-485 environment sensors collect temperature, humidity and water data. They can be connected to the SNSR/COM2 ports on the back of the appliance.

RS-485 Environmental Sensor Properties

Property	Description	Default Value
Sensor #	Sensor ID (Read Only)	System Defined Value
Enabled	Enable or Disable	Enabled
Name	Name of the sensor	Sensor ID
Type	Temperature or Humidity (Read Only)	Temperature
Address	The serial number of the sensor (Read Only)	Information from Sensor
Location	The sensor's location or position	Blank

To add, enable or remove an RS-485 environment sensor:

1. Click *Administration - Sensors - RS-485 Environment Sensor.*
2. Use the drop-down menus to select the Type and Address for the sensor.
3. Enter the name for the sensor and, if applicable, the humidity name.
4. Click *Add*.
5. Check the box to enable the sensor and click *Apply*.
6. To remove the sensor, click the sensor name and click *Remove*.

PDU Temperature Sensors Delta

The appliance provides a delta calculation between two temperature sensors attached to a PDU. This delta can be useful for determining temperature differences between a hot aisle and a cold aisle or the top of the rack or the bottom of the rack.

To add sensors for a delta calculation:

1. From the sidebar, click *Sensors - PDU Temperature Sensors Delta*.
2. Enter a name for the delta.
3. Use the drop-down menu to select either Fahrenheit or Celsius as the unit of temperature.
4. From the PDU field, select the first PDU in the delta and click the *Sensor 1* button.
5. From the PDU field, select the second PDU in the delta and click the *Sensor 2* button.
6. Click *Apply*. The delta appears in the PDU Temperature Sensors Delta table.

To view the delta calculation, click the *Sensors* tab then click *Delta*. The delta appears in the PDU Temperature Sensors Delta table.

To delete a delta calculation:

1. From the sidebar, click *Sensors - PDU Temperature Sensors Delta*.
2. Check the box next to the delta you want to delete then click *Delete*.

Monitoring

The appliance will monitor and generate notifications for a variety of events. You can configure the appliance to store or send the notifications to various destinations for immediate use or for analysis later. All events are automatically added to the event summary tab and cannot be turned off.

When configured, appliance sensor data can trigger syslog or email alerts for any event. Digital Output (DO) relays are for events on the back of the appliance only. They can toggle a relay to enable a fan or alarm.

Email

You can configure the appliance to send alerts to an email address.

To configure email alerts:

1. From the sidebar, go to *Appliance Settings - Email Settings* and enter the SMTP server IP address, port number, sender username and password for the email server.

NOTE: It is recommended you create an email account for the appliance. This will be the account from which the notification emails will be sent.

2. Click *Apply*.
3. From the sidebar, go to *Network Settings* to ensure the host name of the appliance is the fully-qualified domain name. Emails sent from the appliance will have a sender address of notification@<appliance FQDN>.
4. From the sidebar, go to *Monitoring*. Under the Notification Rules heading, check the boxes for the events for which you want to receive email alerts.
5. From the sidebar, go to *Monitoring - Notification Destinations*. Under the Email Address heading, enter the email address where the notifications will be sent.
6. Click *Apply*.

Syslog

You can configure as many as four syslog rules on the appliance. Syslog rules can be assigned to as many as six syslog facility levels. The syslog rules can forward alerts to external syslog servers

or log files.

You can set up logging of messages for the following types of events:

- Events of interest from the appliance
- Sensor alarms generated by sensors on SPs

Messages can be sent to a user defined destination.

Message filtering levels

Messages can be filtered according to their severity, based on any or all of the levels from the following list:

- Emergency
- Alert
- Critical
- Error
- Warning
- Notice
- Info
- Debug

To configure syslog message filtering:

1. From the sidebar, go to *Monitoring*. From the drop-down list, choose the Facility.
2. Under the Notification Rules heading, check the boxes for the events for which you want to receive syslog alerts and click *Apply*.
3. From the sidebar, go to *Monitoring - Notification Destinations* and under the Syslog heading, click *Configure* next to the rule you want to configure.
4. On the Syslog Rules page under the Configure Syslog Rule, enter the Destination. The destination can be an IP address or a log file name.
5. The Tag field is optional and will filter messages that do not match the Tag string.
6. Under the Facility heading, use the arrows to select the local facilities.
7. Under the Severity heading, use the arrows to select the severity.
8. Click *Apply*.

Digital Output

The digital outputs are remote controlled relay ports. These ports, labeled DO1/DO2 on the back of the appliance, can be used to open or close an electric circuit that can drive sirens, lights and locks.

To configure Digital Output notifications:

1. From the sidebar, go to *Monitoring*. Under the Notification Rules heading, check the boxes for the events for which you want to trigger a digital output relay.
2. Click *Apply*.

NOTE: Digital Output (DO) relays are for events on the back of the appliance only.

3. From the sidebar, go to *Monitoring - Notification Destinations* and enter the Digital Output name and location for Digital Output 1 and Digital Output 2.
4. Click *Apply*.

NOTE: Once the digital output relay has been triggered, use the override to reset it.

Sessions

The appliance allows multiple users to log in and run sessions simultaneously. The sessions screen allows you to view all active sessions and delete any unwanted sessions. Click *Sessions* to view all open sessions on the appliance.

To delete a session:

1. From the sidebar, click *Sessions*. The sessions screen appears and lists all appliance and target sessions to the appliance.
2. Select the checkbox next to the session you want to delete, then click the *Delete* button. After a few seconds, the sessions screen will redisplay the open sessions, minus the one you deleted.

Support

From the sidebar, click *Support* to configure diagnostic logging. You can create and save a log file that can be downloaded and sent to technical support. The log file contains debug information necessary for appliance technical support.

To enable system monitoring:

1. Click *Support*.
2. Check the box to enable system monitoring.
3. Set the frequency in minutes and click *Apply*.
4. Check the box to enable SP access monitoring.

5. Use the drop-down menu to select the Log Detail Level.
6. Click *Apply*.

To download the log file:

1. Click *Support*.
2. Click *Download Log*.
3. Browse to the save location and click *Save*.

Security

From the sidebar, click *Security* to enable or disable the following network services:

- Telnet
- ICMP
- SSH
- HTTPS
- HTTP redirect

Certificate

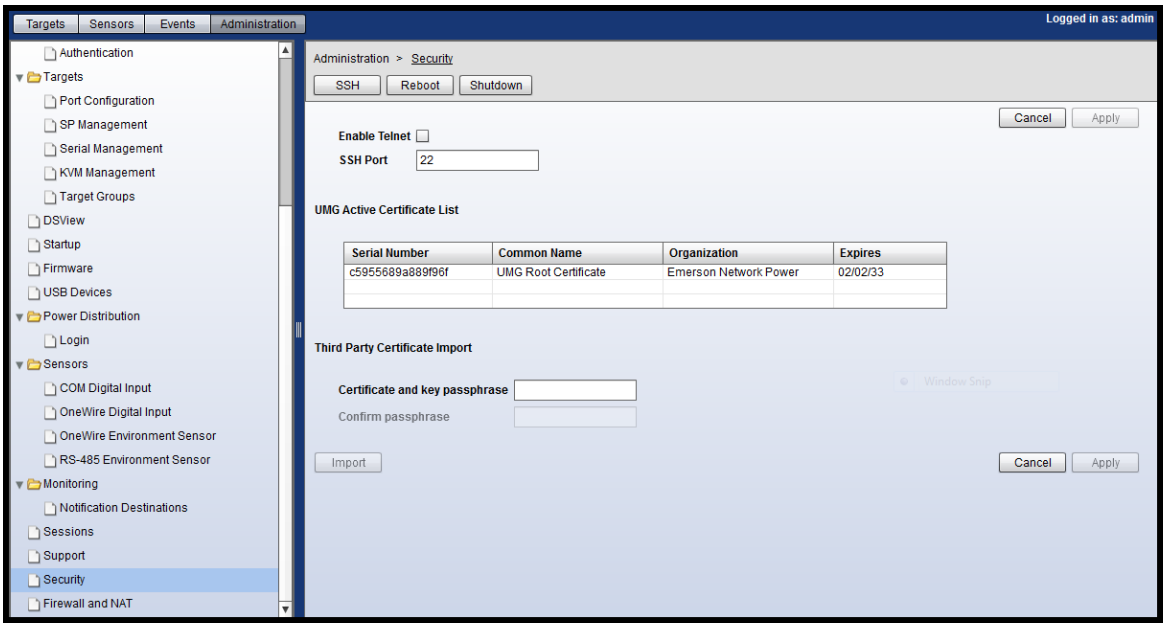
The appliance, by default, has a certificate installed that controls the web services and allows access through HTTPS. Third-party certificates can also be imported and configured. Importing a third party certificate replaces the default appliance certificate. Contact Avocent professional services to delete third party certificates and restore the default certificate.

NOTE: The third party certificate has to be in PKCS12 format.

To import a third-party certificate:

1. From the sidebar, click *Security*.
2. Under Third Party Certificate Import, enter and confirm the Certificate and key passphrase.
3. Click *Import*.
4. Browse to the certificate location and click *Open*.
5. Click *Apply* and restart the appliance.

Third-party Certificate



Firewall and NAT

The firewall and NAT feature enables an administrator to configure the rules governing traffic filtering, IP forwarding and address translation within the appliance.

NOTE: The appliance is specially designed for managing and providing access to device management consoles. It is not supported as a general purpose router, switch or packet filter.

The firewall and NAT features are built from a series of named definitions for networks, hosts, interfaces and services. Before you can configure the firewall and NAT policies, you must define the objects that will be used within the policy rules. It is best to start by defining the interfaces, then defining the networks that will be referenced by your policy rules before finally defining the hosts and services. Each of these are described in the next sections.

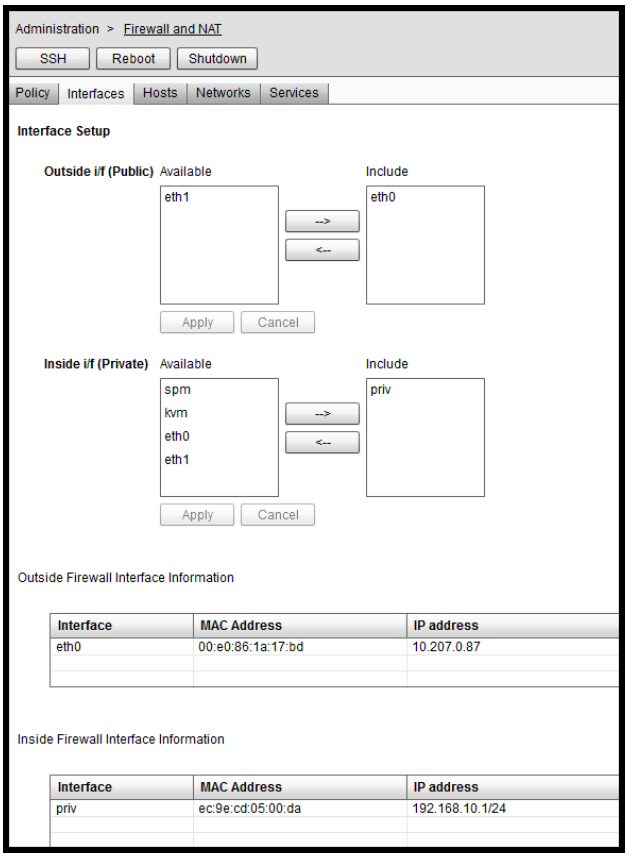
The appliance will already have knowledge of various hosts, networks and interfaces; these objects will be created at the time they are defined or discovered by the appliance. For example, upon connecting a UMIQ module to the appliance, a host definition will be created matching the name assigned to the UMIQ module target.

Interfaces

By default, all physical and virtual interfaces defined within the appliance will be listed on the Interfaces tab. You can access the Interfaces tab by clicking *Firewall and NAT* from the sidebar.

New virtual interfaces can be made for use with private ports by clicking *Administration - Targets - Port Configuration - Network Settings*. For more information on creating an interface, see Port configuration on page 50.

Interfaces Tab



From the Interfaces tab you designate interfaces as either inside or outside, with respect to how they will be used within NAT and firewall rules. Interfaces designated as Inside are private and interfaces designated as Outside are public.

Be sure to designate at least one interface as Outside and one interface as Inside before trying to reference those interfaces within a NAT or firewall rule. When network mode changes or interface name changes occur, this table must be updated to ensure the proper interface is designated as Inside or Outside. Also ensure that IP addresses are correctly resolved in the tables at the bottom of the screen. If IP addresses are not correct, move them from the included list to the available list and back again to refresh the data within the table.

To move an interface:

1. From the sidebar, click *Firewall and NAT*, then click the *Interfaces* tab.
2. Under the Outside i/f (Public) or the Inside i/f (Private) heading, click an interface you want to move from the Available field, then click the *Right Arrow* to move it to the Include field.

3. Click the *Left Arrow* to move the interface back to the Available field, if desired.
4. Repeat as desired for each interface under either the Outside or Inside headings.
5. Click *Apply*.

To create IP aliases for 1-to-1 NAT:

1. From the appliance's Linux shell, type **cd**, then type **/usr/bin/fwnatdirectory**.
2. The fwnat-alias.sh script can be used to create IP aliases on the eth0/eth1/bond0/<bridge group> interfaces.

NOTE: Created IP aliases will appear on the Interfaces tab within the firewall.

Syntax for the script is: **./fwnat-alias [-h] -c <add|del|mod> -i <eth0 | eth1> -n <ifname> -a <cidr formated IP> [-b <broadcast address>] [-m <cidr formated IP>[*<broadcast address>]]**

For example:

```
./fwnat-alias.sh -c add -i eth0 -n drac5 -a 192.168.200.195/24 -b 192.168.200.255
```

Script Syntax Commands Descriptions

Command	Description
-h	Displays the command syntax
-c	Command to add, delete or modify an IP alias interface
-i	Alias for eth0 | eth1 | bond0 | bridge group
-n	Name of the alias up to 8 characters
-a	IP address in CIDR format
-b	Broadcast address
-m	Modified IP address in CIDR format with an '*' preceding the modified broadcast address

Defined networks

A network definition denotes a range of IPs through the CIDR formatted IP address. The subnet address/ID is the appropriate value for the IP address field combined with the subnet mask in prefix notation.

Defining a network and associating it with an interface is an efficient way of using a single NAT or firewall rule to apply to any and all host IPs residing within an IP range.

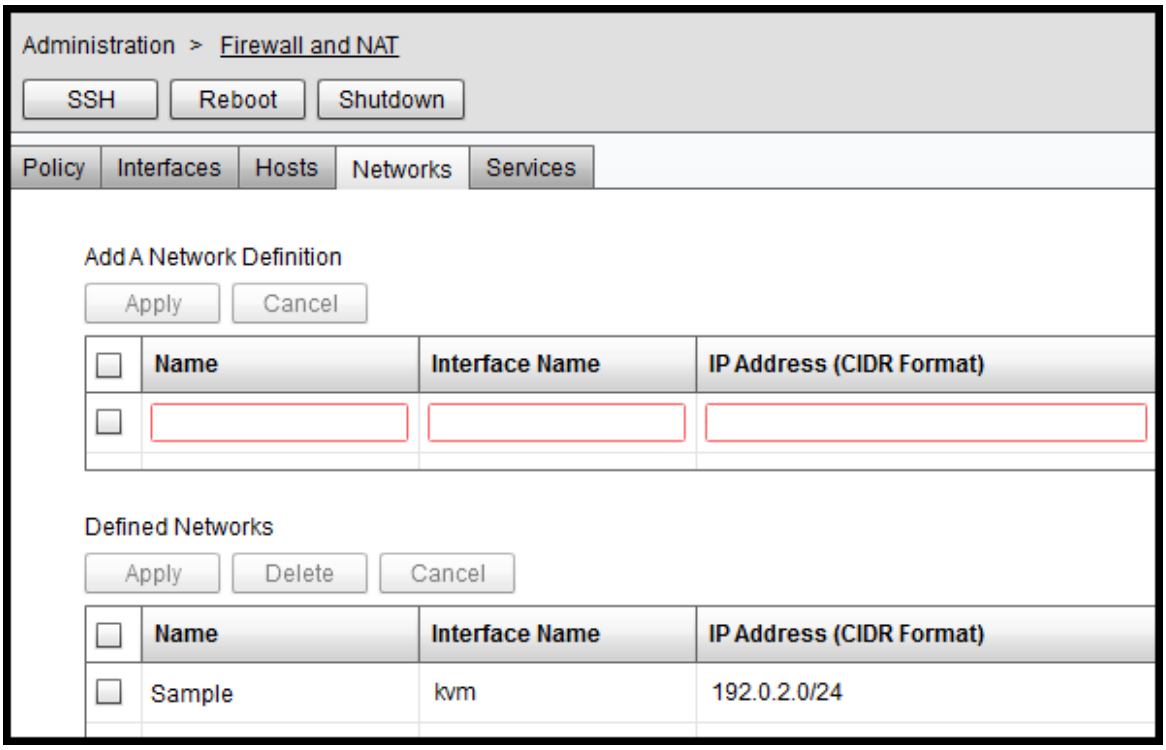
NOTE: Creation of network definitions is useful for grouping hosts within a range of IPs but is not required for all types of NAT and firewall rules.

For example, a host which has an IP address of 192.168.0.2 and a subnet mask of 255.255.255.0 would belong to the 192.168.0.0 network. Representing a subnet mask in prefix notation is an efficient way of designating which part of the network address is the subnet ID and which part

represents all possible hosts within the subnet. The best way to designate an IP range of 192.168.0.1-254 within a network definition on the appliance would be using the CIDR formatted address of 192.168.0.0/24.

This process effectively assigns a name to a range of IPs or an entire network. The NAT and firewall rules rely on definition names exclusively.

Networks Tab



To add a network definition:

1. From the sidebar, click *Firewall and NAT*, then click the *Networks* tab.
2. In the Name field, enter a name for the network definition.
3. In the Interface Name field, enter the name of the interface with an IP from, or that has access to, the network being defined. The name must match one of the virtual or physical interfaces listed on the Interfaces tab.

NOTE: The network and interface names each must be unique names between 3 and 40 alphanumeric characters.

4. In the IP Address field, enter a valid subnet ID for the network in CIDR format.
5. Click *Apply*.

To modify or delete a defined network:

1. From the sidebar, click *Firewall and NAT*, then click the *Networks* tab.
2. Under the Defined Networks heading, check the box next to the network you wish to modify or delete.
3. Make your changes and click *Apply*.

   -or-

   Click *Delete* to delete the defined network.

Hosts

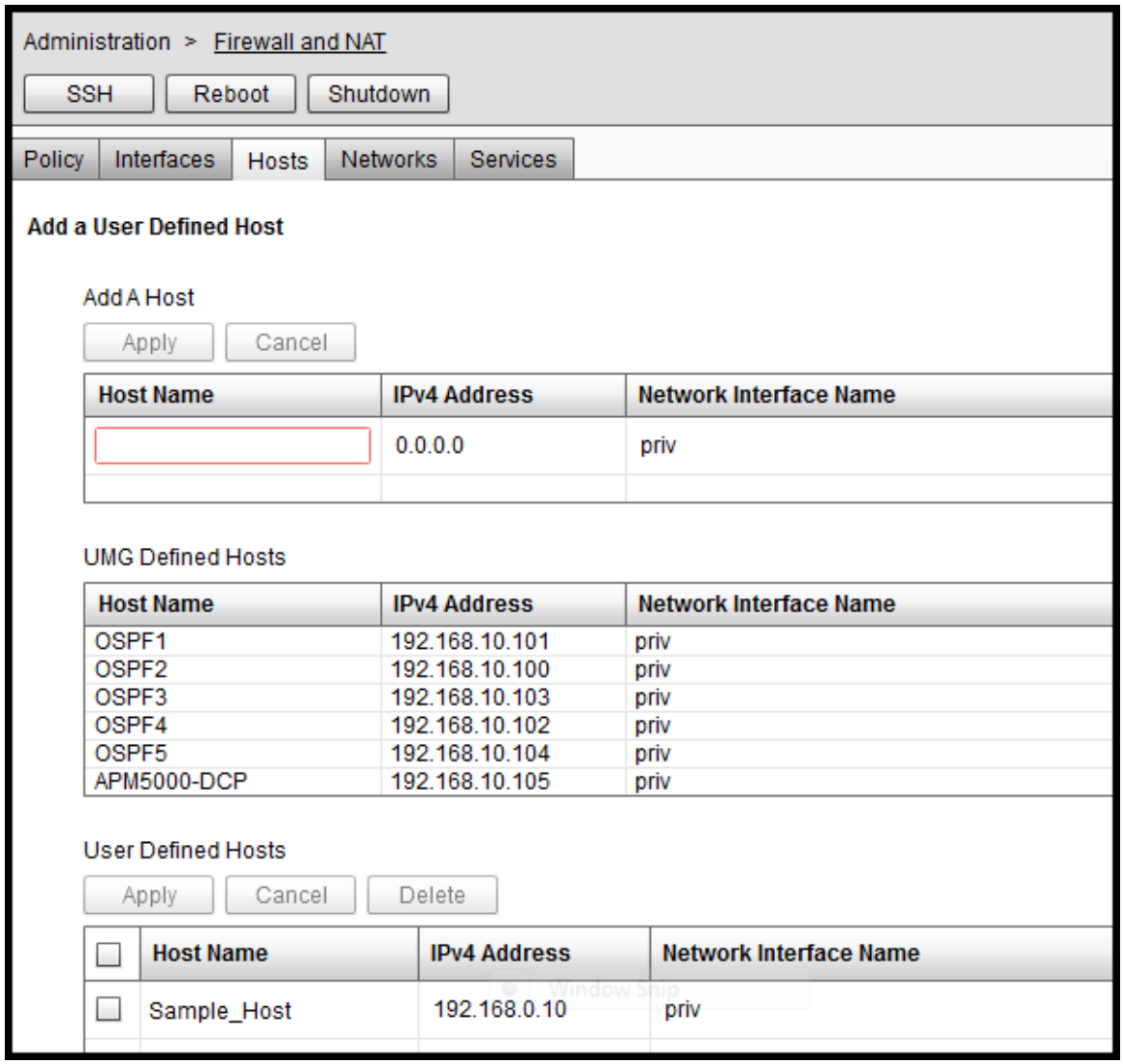
Host definitions can be used in NAT and firewall rules for situations when an individual IP/host needs to be referenced separately than other hosts that would be affiliated with a network definition, or when multiple hosts need to be referenced uniquely with their own NAT or firewall rules.

This process is effectively assigning a name to an IP address, and then using that name within the NAT and firewall rules.

By default, the lists of hosts will be populated by SPs or UMIQ modules that have been connected to or discovered by the appliance. You can create new host entries to represent any IP regardless of the device.

NOTE: Creation of hosts is useful for individual IP differentiation but not required for all types of NAT and firewall rules.

Hosts Tab



To add a host:

1. From the sidebar, select *Network - Hosts*.
2. Click *Add* to add a new host.
3. Enter a name to represent the host, an IPv4 Address and the physical or virtual interface which can communicate with this host. Then click *Apply.* The new host definition will appear in the User Defined Hosts table.

NOTE: The network interface must be one listed on the Interfaces tab.

To delete a host:

1. From the sidebar, select *Firewall and NAT - Hosts*.
2. Click on the name of the host you want to delete, then click *Delete*.

Services

Service definitions represent programs and network traffic by their TCP/UDP port number or port range. Service definitions are essential for network address translation of ports (PAT) where a single outside IP and unique ports are used to represent unique inside IP/ports.

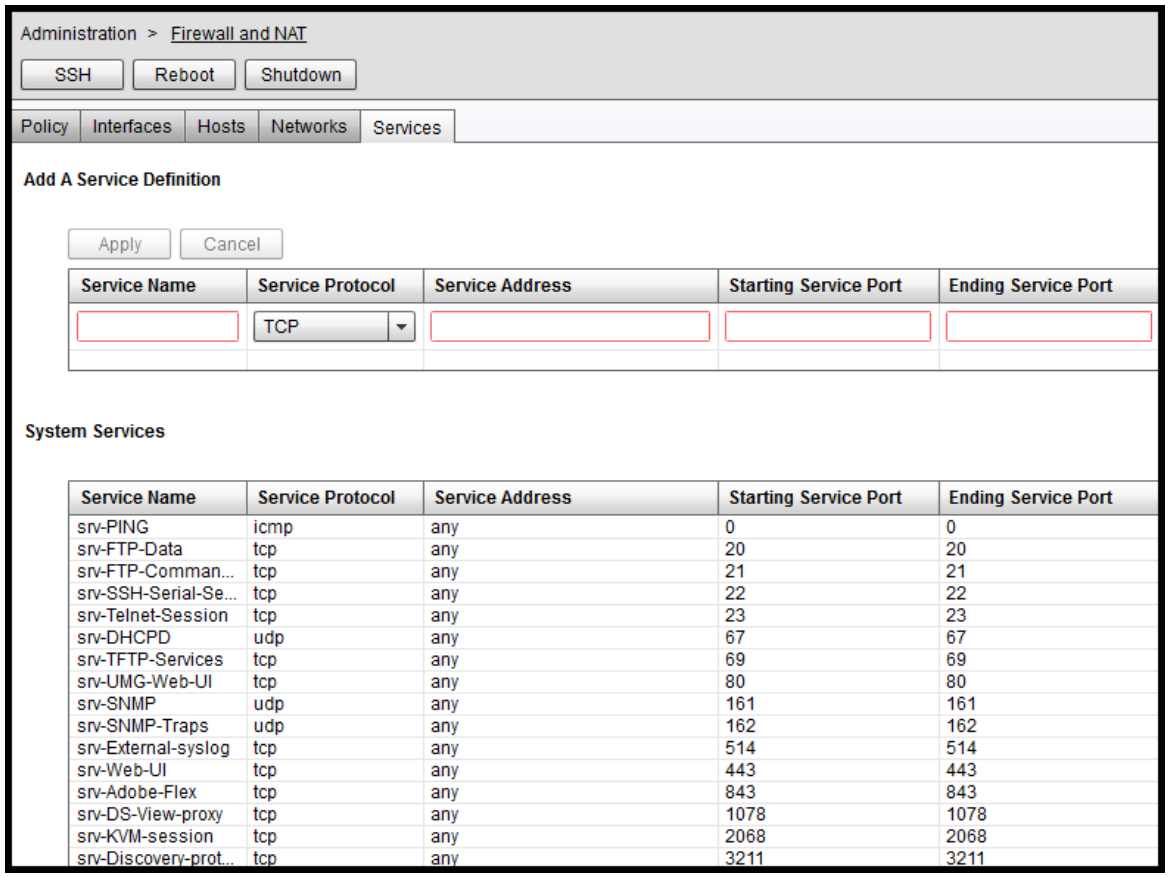
For example, if two unsupported rack PDUs were connected to private appliance ports, had private/inside IP addresses assigned to them and each had a web management console, then two NAT rules could allow outside administrators to access the rack PDU web management interfaces. Each NAT rule would use a unique service definition to represent the TCP port of the rack PDU web management interfaces on the public/outside IP of the appliance. For example, a service definition of 8080 would translate to 80 for the first rack PDU and 8081 would translate to 80 for the second rack PDU.

The IP protocol supports 65,535 ports and the Internet Assigned Numbers Authority (IANA) has a registry of common/well-known TCP and UDP ports that represent various programs and services. This registry should be consulted to determine which ports are used by the applications or traffic for which you want to create NAT and firewall rules. Some applications do not register all of their ports with IANA and will typically include port usage lists with their product documentation.

By default, the appliance has several well-known ports/port ranges defined as system services. Many of these services are included in the default appliance firewall policy in order to support the various features provided by the appliance.

NOTE: Creation of service definitions is necessary for granularity but not required for all types of NAT and firewall rules.

Services Tab



To create a service definition:

1. From the sidebar, click *Firewall and NAT*, then click the *Services* tab.
2. In the Service Name field, enter a name to be used for the service.

NOTE: A service name can be between 3-40 alphanumeric characters.

3. In the Service Address field, enter a valid subnet ID for the service in CIDR format. For example, 192.168.10.0/24.
4. Enter the starting and ending ports for the IP protocol.

NOTE: Valid entries are from 0-65,535.

5. Click *Apply*. The new service definition will be displayed in the user-defined service definition table.

To modify or delete a user-defined service definition:

1. From the sidebar, click *Firewall - NAT*, then click the *Services* tab.

2. In the User Defined Services table, check the box next to the service you want to modify or delete.
3. Make your changes and click *Apply*.

   -or-

   Click *Delete* to delete the service definition.

Policy

An administrator can control the flow of IP traffic in, out and through the appliance with a NAT and/or firewall policy.

An administrator can create policies that will allow an external host or server to communicate directly with IP devices (hosts) that are securely connected to the private ports of the appliance. A NAT or forward policy will allow traffic to bypass the normal authentication and permission securities built into the appliance. It is recommended that such a security bypass only be implemented for select few situations.

For example, an SP management tool (HP SIM) residing on the production network could be allowed to directly communicate with SPs (iLO) connected to the private ports of the appliance for the purpose of monitoring, configuration and firmware updates. But user sessions would not be permitted to bypass the appliance's securities and SP interaction would be governed by appliance-based permissions. This could be achieved through a simple NAT or IP forward policy rule allowing the management tool access to the SP. In addition, a firewall filter rule would prevent users from exploiting the NAT/forward rule used by the management tool.

The following criteria should be used to make the determination between a NAT rule or an IP forward rule for providing bypass access to private hosts. An IP forward rule requires that the private IP network/subnet is unique with regard to other production networks and even other appliance private networks. If two appliances have the exact same IP network associated with their private ports/hosts, an external host would be unable to properly make a routing decision between the appliances when trying to send traffic to a private host behind one of them. The benefit of a NAT rule is that the same IP network/subnet can be repeated for private ports/hosts on multiple appliances without the same routing conflict. The appliance supports two forms of NAT: 1-to-1 NAT (IP masquerading) and port address translation (PAT/NAT overload).

For successful end-to-end communication leveraging an IP forward policy rule, the private host must treat the nearest appliance IP as its gateway and all external hosts must have routes (static or dynamic) that reference the private network/subnet and nearest appliance IP.

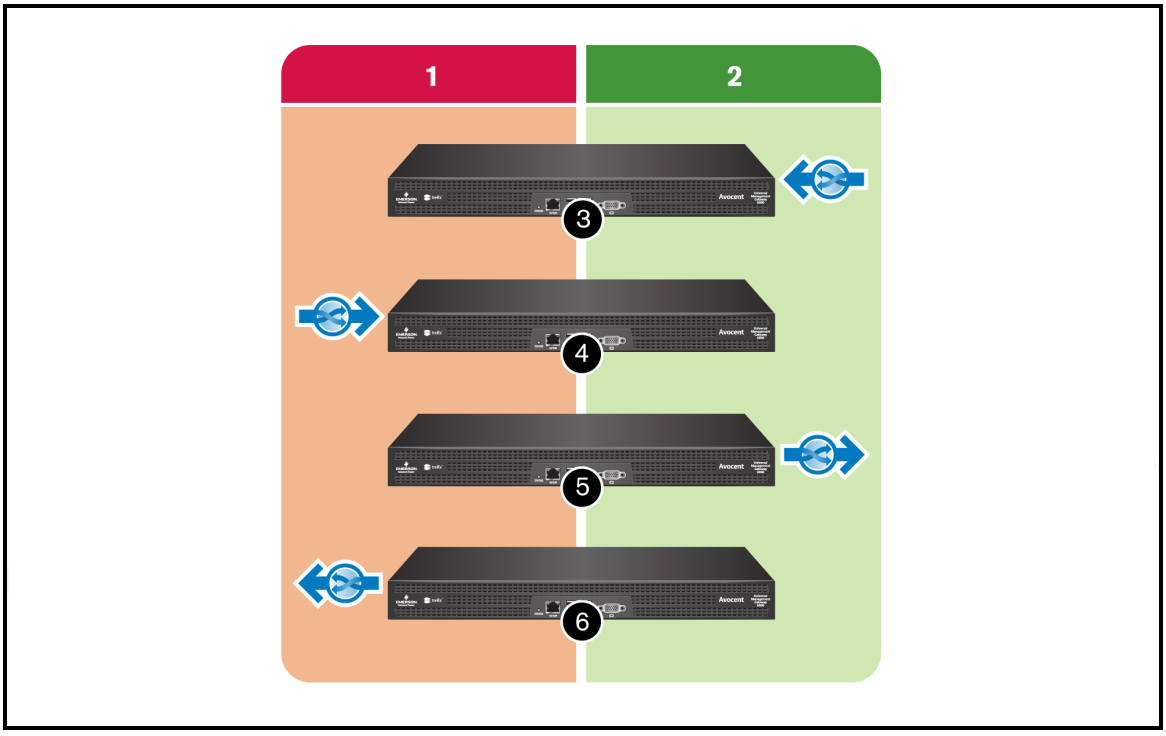
NOTE: In this context, the nearest IP is the one belonging to the same network or the closest routable IP on a different network.

Network configuration changes made to eth0, eth1, bond0, br0, priv, kvm, spm, and any other bridge groups and virtual private interfaces could affect the applicability of NAT and firewall rules. All firewall rules that reference interface names or addresses that were replaced during the network configuration change should be edited within the NAT and/or firewall rules to ensure proper network communication. For example, eth0/eth1 must be replaced with br0 or bond0 where applicable.

NAT flow

Traffic entering an interface (incoming) is translated according to a NAT rule before any filtering rules and before any routing decisions. Traffic exiting an interface (outgoing) is translated according to a NAT rule after filter rules and routing decisions have been made.

NAT Flow



NAT Flow Table Descriptions

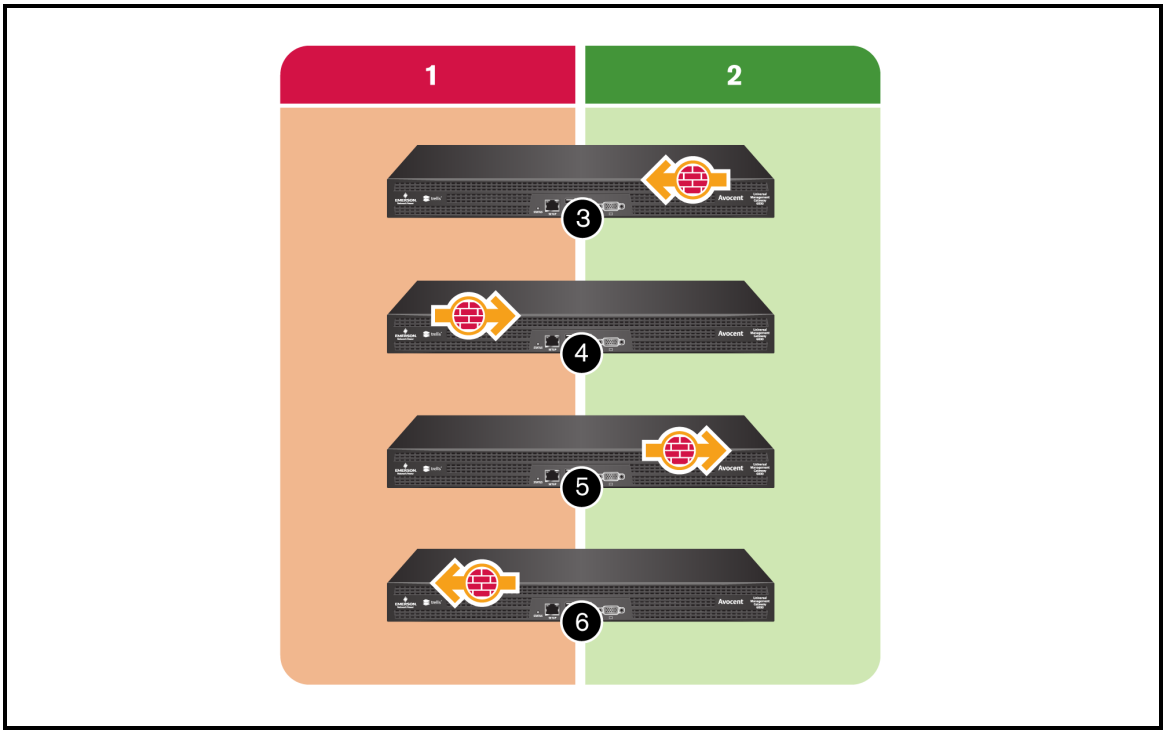
Number	Description
1	Outside.
2	Inside.
3	*Incoming* NAT on an *inside* interface.
4	*Incoming* NAT on an *outside* interface.

Number	Description
5	*Outgoing* NAT on an *inside* interface.
6	*Outgoing* NAT on an *outside* interface.

Firewall flow

Traffic entering the appliance (input) is subject to filter rules after it has passed through NAT rules and routing decisions. Traffic exiting the appliance (output) is subject to filter rules before routing decisions are made and NAT rules perform any translation.

Firewall Flow



Firewall Flow Table Descriptions

Number	Description
1	Outside.
2	Inside.
3	*Input* filter on an *inside* interface.
4	*Input* filter on an *outside* interface.
5	*Output* filter on an *inside* interface.
6	*Output* filter on an *outside* interface.

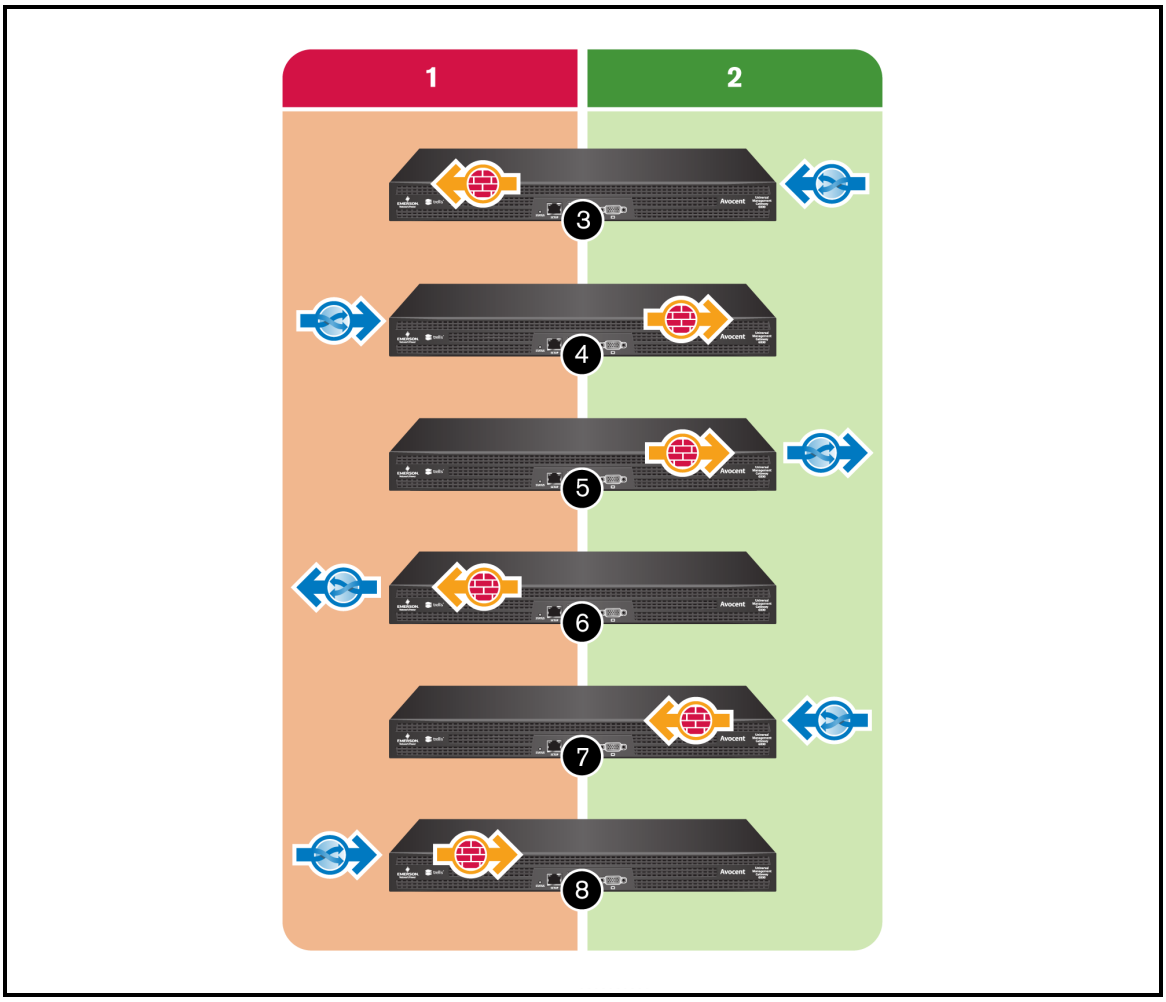
Firewall and NAT flow

Traffic flowing through the appliance which is expected to be both translated and filtered will require both NAT and firewall rules designed to match the traffic patterns appropriately. Translation

happens before filtering when traffic is entering the appliance and filtering happens before translation when traffic is exiting the appliance.

For example, if input traffic passes through an incoming NAT rule, which has translated the destination address, then the only way for the filter rule to match a destination address is to have the filter rule match the pattern of the translated destination address and not the original destination address of the traffic. This is because the address was translated before it could be filtered.

Firewall and NAT Flow



Firewall and NAT Flow Descriptions

Number	Description
1	Outside.
2	Inside.
3	*Incoming* NAT on an inside interface before *output* filter on an outside interface.
4	*Incoming* NAT on an outside interface before *output* filter on an inside interface.
5	*Output* filter on an inside interface before *outgoing* NAT on the same inside interface.
6	*Output* filter on an outside interface before *outgoing* NAT on the same outside interface.

Number	Description
7	*Incoming* NAT on an inside interface before *input* filter on the same inside interface.
8	*Incoming* NAT on an outside interface before *input* filter on the same outside interface.

NAT setup

An administrator can add and configure NAT policies to perform address translations. Depending upon the routing within the environment and the appliance, it may be important to perform the NAT setup as traffic arrives (pre-routing) or as the traffic exits (post-routing).

NAT Setup Definitions

Parameter	Definition
Direction	Direction of traffic flowing into/out of the interface performing NAT.
Order	From top to bottom, traffic is compared to the entries of the NAT policy looking for a pattern match.
Interface	This is the interface where traffic will be inspected for traffic pattern matching and also the interface where the NAT will be performed.
Source	The source host/network listed here is inspected for traffic pattern matching.
Destination	The destination host/network listed here is inspected for traffic pattern matching.
Service	The service listed here is inspected for traffic pattern matching.
Translated source	The host/interface address to replace the source value shown in the traffic that matches this NAT policy pattern. If the destination address is not intended to be translated, then type **any** in this field.
Translated destination	The host/interface address to replace the destination value shown in the traffic that matches this NAT policy pattern. If the destination address is not intended to be translated, then type **any** in this field.
Translated service	The destination service (TCP/UDP port) to replace the value shown in the traffic that matches this NAT policy pattern. If the destination port is not intended to be translated, then type **any** in this field.

To add a NAT Policy:

1. From the sidebar, click *Firewall and NAT*, then click the *Policy* tab.
2. In the NAT Setup section, under the Add a NAT Policy heading, you can add a NAT policy by use the drop-down menu to select either Outgoing or Incoming under Direction.
3. Enter valid names for the following: Interface, Source, Destination, Service, Translated Source, Translated Destination and Translated Service.

NOTE: Valid names must be between 3 and 40 alphanumeric characters.

4. Use the drop-down menu to either activate or deactivate the Rule State.
5. Click *Apply*. The new NAT Policy will appear under the Defined NAT Policies heading.

To modify or delete a NAT Policy:

1. From the sidebar, click *Firewall and NAT*, then click the *Policy* tab.
2. Under the Defined NAT Policies heading, check the box next to the policy you want to edit or delete.
3. Make inline changes to the row you want to edit and click *Apply*.

   -or-

   Click *Delete* to delete the policy.

Firewall setup

By default, the appliance is pre-populated with system-defined firewall policy rules that support appliance features. An administrator can create additional firewall policy rules to either relax or strengthen the appliance's default security state.

Firewall Setup Definitions

Parameter	Definition
Direction	Direction of traffic flowing into/out of the interface performing NAT.
Order	From top to bottom, traffic is compared to the entries of the NAT policy looking for a pattern match.
Interface	This is the interface where traffic will be inspected for traffic pattern matching and also the interface where the NAT will be performed.
Source	The source host/network listed here is inspected for traffic pattern matching.
Destination	The destination host/network listed here is inspected for traffic pattern matching.
Service	The service listed here is inspected for traffic pattern matching.
Action	The action to be performed on the traffic that matches the pattern for this rule.
Connection Status	This rule will apply to traffic matching the chosen connection status type. - Not needed: The traffic is associated with no known connection. - New: The traffic has started a new connection or otherwise associated with a connection which has not seen packets in both directions. - Established: The traffic is associated with a connection which has seen packets in both directions. - Related: The traffic is starting a new connection, but is associated with an existing connection, such as an FTP data transfer, or an ICMP error.
Rule State	Defines whether the rule state is active or not.

To add a Firewall Policy:

1. From the sidebar, click *Firewall and NAT*, then click the *Policy* tab.
2. In the Firewall Setup Section, under the Add a Firewall Policy heading, use the drop-down menu to select Input, Output or Forward under Direction.
3. Enter valid names for the following: Order, Interface, Source, Destination and Service.

NOTE: Valid names must be between 3 and 40 alphanumeric characters.

4. Use the drop-down menus to select the Action, Connection Status and Rule State.
5. Click *Apply*.

For each rule, an action (either *ACCEPT*, *DROP*, *REJECT* or *LOG*) must be selected from the Policy drop-down menu. The selected action is performed on an IP packet that matches all the criteria specified in the rule.

If *LOG* is selected from the drop-down menu, it will create entries in syslog about the traffic matching this rule without performing a specific ACCEPT, REJECT or DROP action. In order to log and ACCEPT or log and REJECT/DROP a second rule must follow the log rule with the same traffic pattern and the desired ACCEPT, REJECT, DROP action. The administrator can configure a log level, a log prefix and whether the TCP sequence, TCP options and IP options are logged in the Log Options Section.

If *REJECT* is selected from the drop-down menu, an administrator can select an option from the Reject with pull-down menu; the packet is dropped and a reply packet of the selected type is sent.

To modify or delete a Firewall Policy:

1. From the sidebar, click *Firewall and NAT*, then click the *Policy* Tab.
2. Under the User Defined Firewall Policies heading, check the box next to the policy you want to edit or delete.
3. Make your changes and click *Apply*.

   -or-

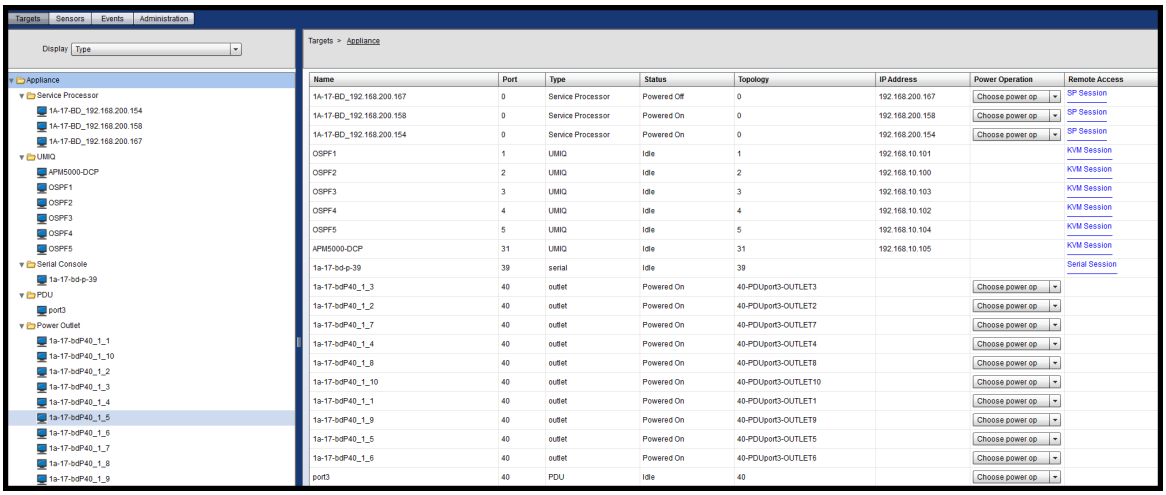
   Click *Delete* to delete the policy.

Targets

When logging into the appliance, the Targets tab is the default view. The Targets tab view consists of a sidebar and the Targets table.

NOTE: The actions in this section can be performed by first clicking *Targets* in the tab bar.

Targets Tab



Targets Tab Descriptions

Number	Description
1	Sidebar
2	Targets Table

From the sidebar, you can access an appliance and its associated targets. From the Targets table, you can view information about the target and open a session to it. The Targets table can be sorted according to column headers and the various column widths can be resized according to preference. Customizations revert to default when the user logs out. The targets can be viewed in three formats: list view, group view or type view depending on the selection made:

- The list view is a flat list of targets grouped under a parent appliance node. Selecting the appliance list item shows a target summary screen.
- The type view shows all targets grouped by their target types.
- The group view shows only the defined target groups and their contents. Targets not in a group will not be visible. Targets in more than one group will appear with each group. The group view shows Target groups that have been created within the Administration tab.

Status Descriptions

Status Value	Description
In Use	Session is active
Upgrading	Session is upgrading
Power On	One or more sockets are in the process of being turned on
Powering Off	Target is shutting down
No Power	No power is detected
Partial Power	Target has sockets in both on and off states
Locked Off	One or more sockets are locked in the off position
Powered Off	One or more sockets are turned off
Locked On	One or more sockets are locked in the on position
Idle	No sessions are active
Powered On	Sockets are turned on
Unknown	No status available

NOTE: If a filter is applied, only those matching targets will be displayed.

Service Processors

Available service processors and their associated target devices can be viewed under the Targets tab. From the sidebar, click on a service processor to view and/or modify its configuration settings.

Properties

Click the *Properties* tab to view general information and the FRU information for a service processor.

System

From the system tab you may view the power status and the status of the indicator LED (if available) on managed target devices, manage power, turn the LED on and off remotely and view and control the time setting.

To view and control the power status:

1. Click an SP name.
2. Click the *System* tab. The system information window appears and displays the current power status of the target device.
3. From the drop-down list, select the desired power action.
4. Click *Apply*.

To view and control the SP's indicator LED:

1. Click an SP name.
2. Click the *System* tab. The system information window appears and the current chassis LED status of the target device is displayed under the Enclosure heading.
3. To change the indicator status of the target device, complete any of the following steps:

   To turn the LED on and leave the LED flashing for a specified number of seconds, check the button next to Indicator Blink then enter the number of seconds in the Seconds field.

   - or -

   To turn the LED on and leave the LED flashing, check the button next to Indicator On.

   - or -

   To turn the LED off, check the button next to Indicator Off.
4. Click *Apply*. The Indicator Status will reflect your changes.

To view and control the time setting:

1. Click an SP name.
2. Click the *System* tab.
3. Select either synchronize with appliance or synchronize with client PC and click *Apply*.

SEL

The SEL tab displays all of the System Event Log (SEL) entries returned from the service processor. An administrator can filter all entries in the table by inputting a case sensitive text string and clicking *Filter*. Click *Clear All* to remove all SEL information and click *Refresh* to refresh the page.

Sessions

From the Sessions tab, you can open sessions with an SP on the appliance as well as view a list of all sessions by all users to a target SP. The Sessions page contains buttons based on the abilities of the SP and the permissions of the user viewing the page.

SP Access sessions allow direct browser/vKVM connection from a remote client to SPs being managed by the appliance.

SP Access is supported for SPs that are both physically connected to the appliance and SPs that are logically managed by IP and not physically connected to the appliance.

The framework used to provide SP Access is built upon the basic principle of a reverse proxy and replaces the DirectCommand architecture.

SP Access Session Types

Destination	Type	Session Button
Server OS	Graphical KVM	Virtual KVM/Media
Server OS	Command Line Interface	Serial over LAN (SOL), SOL History
Service Processor	Browser	Browser-AutoLogin, Browser (manual login)
Service Processor	Command Line Interface	SSH-AutoLogin, SSH (manual login), Telnet (manual login).

When a user initiates an SP Access session, the appliance will open a small TCP port range to facilitate communication between the client and the SP. The client PC will open a pop-up browser window and will connect to the IP of the appliance using one of the ports allocated for the session. If the session type being launched is a SP Access Browser session, the appliance will FWD the traffic from the client pop-up window to the Service Processor and the user will be presented with the login prompt for the SP browser UI.

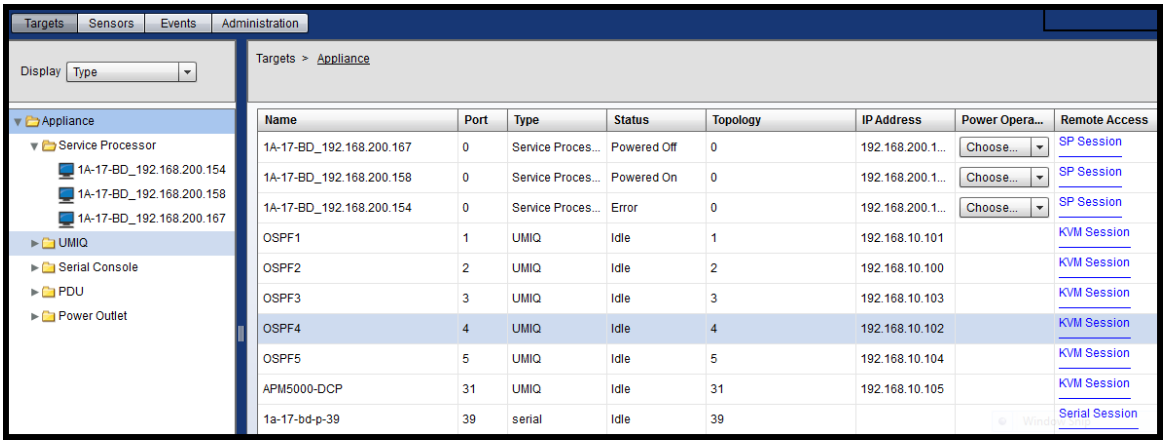
If the session being launched is an SP Access Browser (auto login) session, the appliance will utilize the stored service credentials and will log into the browser UI of the SP before forwarding the client browser to the signed-in UI session of the SP.

If the session type being launched is an SP Access vKVM/vMedia session, the appliance will follow all of the same steps included with the SP Access Browser (auto login) session with the addition of launching the Java vKVM viewer of the SP and passing the session back to the client PC.

To start a session, click a button for the session type you want. If a user doesn't have permission to launch a particular session type, or if the SP does not support the session type, then the corresponding button for that session type is grayed out.

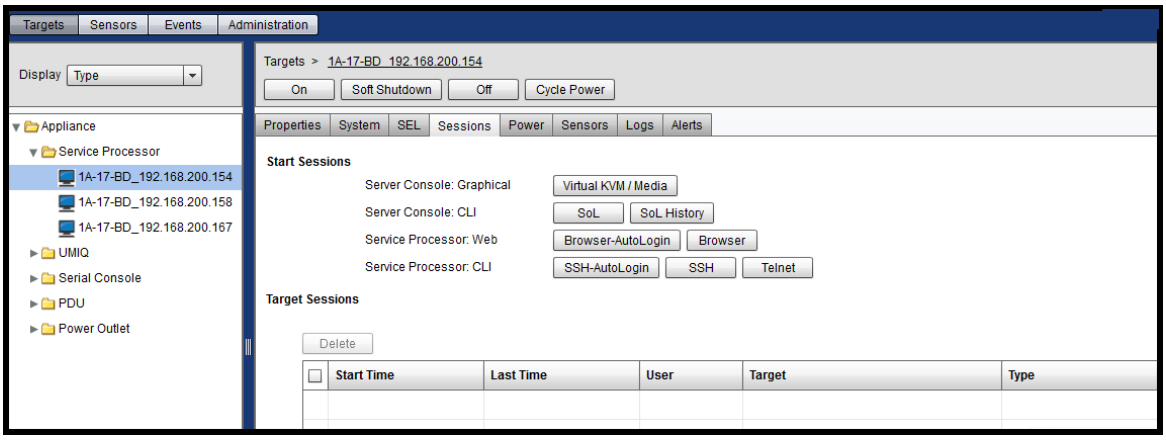
There are two ways to access the Sessions page. From the Targets tab, you can click *Appliance*, then click the SP Session link under Remote Access.

Sessions Page Access



Or, you can click on an SP name from the sidebar, then click the *Sessions* tab.

Sessions Page Access 2



To close an SP Access session:

1. From the Sessions page, click the box next to the session you want to close.
2. Click *Delete*.

Power

Click the *Power* tab to view the power consumption information for the target device. Click *Refresh* to refresh the power consumption information.

NOTE: Check the appliance firmware release notes to determine if your SP type supports this feature.

Power capping

Power capping is a process of reducing or limiting the power consumption allotted to a server. Implementation of a power cap will vary from server to server and typically relies on assigning various processor "P" states or processor clocking limits.

Under the Power Capping heading, you can view power information, including status, thresholds, correction time and sampling period. Fields that aren't supported by the SP/server will be grayed out.

NOTE: The default values are dependent on the SP type.

If supported by the SP/server, you can enable power capping and configure thresholds for the SP/server by clicking *Configure*.

NOTE: Before enabling power capping, consider the possible effect a lower clock rate will have on the applications hosted by the server.

Power capping can be enabled or disabled and assigned a power threshold watt value.

The correction time is the number of milliseconds the SP/server will wait before applying a corrective "P" state or clock rate to reduce power consumption below the threshold. The sampling period is how often in seconds the SP/server will query for current power consumption. The exception action is the action the SP/server will take when a threshold is exceeded, and the options will vary from server to server.

Sensors

Click on the *Sensors* tab to view the sensor information for the target device. Click *Refresh* to refresh the sensors information.

Logs

Click the *Logs* tab to download the SOL data buffering log or to clear all data log history.

The log files can be accessed or downloaded from the appliance shell in the /log directory.

Alert Destinations

Click the *Alert Destinations* tab to enable and configure SNMP alert destinations for the target device. From this screen, you can change the community name and IP field for the alert.

NOTE: The screen options will vary depending on the capabilities of the SP.

UMIQ Modules

Available UMIQ modules can be viewed under the Targets tab. From the sidebar, click on a UMIQ module to view its settings. Click *Connect* to open a KVM session with the selected UMIQ module.

To view available UMIQ modules:

1. From the sidebar, click *UMIQ* and then click on a target to view its status and the power status.
2. Click *Connect* to open a KVM session with the target.

KVM session optimization

The UMIQ module performs analog-to-digital video conversion, and the session quality will be subject to cleanliness of the video signal coming from the server.

A poor quality session will exhibit blocky video and extremely slow mouse response.

To improve session performance:

1. In the KVM viewer, click *Tools-Automatic Video Adjustment* to calibrate the A/D converter to the video signal coming from the server video card.
2. To identify a KVM session that is slow due to unclean video signals, click *Tools-Manual Video Adjustment*. A clean video signal will create 0 Pkts/Sec. on the performance monitor when there is not any activity on the target server.

NOTE: Adjusting the screen resolution and screen refresh rate can have a significant effect on the cleanliness of the video signal and the speed of the resulting KVM session. For best results, try different combinations of these two settings followed by an auto video adjustment to improve the session speed.

The amount of video input plays a big role in the speed of KVM sessions. Lower screen resolutions will be faster than higher screen resolutions. Decreasing the color depth and the screen scaling will also decrease the amount of KVM session data being transported and will increase session speed.

If the above optimization options are ineffective at improving session speeds the Video Noise Control setting can be enabled, which will increase session speed by ignoring small video changes. The only negative to this setting is that it can increase the appearance of video “blocks”. Also take note of the other settings that can be configured for KVM targets globally or individually.

The following information is an example of what is possible but not guaranteed since every target and every network will be different. You will also note that some of the metrics are not entirely analogous (i.e FPS vs. Pkts/Sec.) Also, the bandwidth usage does not reflect the quality / fluidity of the session (the KVM session was much smoother and better than the vKVM).

Appliance KVM session in a 100mbps LAN environment:

- KVM window resolution 1280x1024 @70hz (Windows Server)
- Zero screen movement = 0 pkts/sec (avg. 0.7kbps download | 0.5kbps upload)
- Continuous mouse circles movement on screen = 35 pkts/sec (avg. 216kbps download | 247kbps upload)
- Rapidly opening and closing full-screen windows = 35-100 pkts/sec (~ 2.9mbps download | 257kbps upload)

KVM window resolution 1024x768 @70hz (Windows Server)

- Zero screen movement = 0 pkts/sec (avg. 0.9kbps download | 0.4kbps upload)
- Continuous mouse circles movement on screen = 30 pkts/sec (avg. 212kbps download | 246kbps upload)

- Rapidly opening and closing full-screen windows = 30-70 pkts/sec (avg. 2.5mbps download | 230kbps upload)

KVM window resolution 1024x768 @60hz (Ubuntu Desktop)

- Zero screen movement = 0 pkts/sec (avg. 1.3kbps download | 1.0kbps upload)
- Continuous mouse circles movement on screen = 30 pkts/sec (avg. 470kbps download | 245kbps upload)
- Rapidly opening and closing full-screen windows = 40-50 pkts/sec (avg. 750kbps download | 180kbps upload)

Serial Console

Available serial targets can be viewed under the Targets tab.

To view available serial targets:

1. From the sidebar, click *Serial Console* and then click on a target to view properties and logs.
2. Click *Connect* to open a serial session with the target.
3. Click *Properties* to view the target's properties.
4. Click *Logs* to view the target's log files. You can also download and clear log files from this screen.

PDU

Each PDU and its associated outlets are listed under the Targets tab. From the sidebar, click a PDU to view and/or modify its configuration settings. For read only information on the PDU, circuits and outlets, view the following tabs: *Properties, Outlets, Overview, Current, Voltage, Power Consumption, Energy Consumption and Environment.* To modify configuration of outlets, the PDU, phases, circuits or environment, click the *Settings* tab.

Properties

From the Properties tab, you can view information about the PDU and power control all outlets as well as upgrade the PDU's firwmare, reboot the PDU, reset the overcurrent protection, restore factory defaults and access the browser UI.

To manage a PDU:

1. From the sidebar, click the PDU you want to manage to open its Information page.

2. Click the *Upgrade*, *Reboot*, *Reset HW Overcurrent Protection*, *Restore Factory Defaults* and *Browser* buttons as desired.

NOTE: The power controls (On, Off and Cycle) will be applied to all outlets of the PDU.

Outlets

By selecting the *Outlets* tab, you can view status, number and name of outlets. You can turn on, turn off, cycle, lock or unlock selected outlet(s).

To manage outlets:

1. From the sidebar, click on the PDU to manage its outlets.
2. Click the *Outlets* tab.
3. Check the box or boxes next to the name of the outlet or outlets you want to manage.
4. Click the *On*, *Off*, *Cycle*, *Lock Unlock* or *Save Status* button.

Overview

By selecting the *Overview* tab, you can view a PDU's name, outlets, current, voltage, power, power factor, energy and alarm.

Current, Voltage, Power Consumption, Energy Consumption

By selecting the *Current, Voltage, Power Consumption or Energy Consumption* tabs, you can reset each's maximum, minimum and average values.

To reset values:

1. Select PDUs and/or outlets to reset.
2. Select the *Current*, *Voltage*, *Power Consumption* or *Energy Consumption* tab as desired.
3. Click *Reset Values*.

Settings

By selecting the *Settings* tab, you can view and change the settings of Outlets, PDU, Phases, Circuits and Environment.

To configure Outlets settings:

1. Select a PDU to manage.
2. Click on the *Settings* tab.
3. Click *Outlets*.

4. Select the outlets you want to configure and click *Edit*. You can change the Post On Delay and Post Off Delay as well as the High Critical, High Warning, Current Low Warning and Low Critical thresholds.
5. Click *Apply* when finished.

To configure PDU settings:

1. Select a PDU to manage.
2. Click on the *Settings* tab.
3. Click *PDU*.
4. Select the PDUs you want to configure and click *Edit*. You can configure Cold Start Delay as well as High Critical, High Warning, Low Warning and Low Critical thresholds and Estimated Power Factor.
5. Click *Apply* when finished.

To configure Phases settings:

1. Select a PDU to manage.
2. Click on the *Settings* tab.
3. Click *Phases*.
4. Select the phases you want to configure and click *Edit*. You can configure High Critical, High Warning, Low Warning and Low Critical thresholds.
5. Click *Apply* when finished.

To configure Circuits settings:

1. Select a PDU to manage.
2. Click on the *Settings* tab.
3. Click *Circuits*.
4. Select the circuits you want to configure and click *Edit*. You can configure High Critical, High Warning, Low Warning and Low Critical thresholds.
5. Click *Apply* when finished.

To configure Environment settings:

1. Select a PDU to manage.
2. Click on the *Settings* tab.
3. Click Environment.

4. Select the sensors you want to configure and click *Edit*. You can configure a sensor's Name and Unit as well as its High Critical, High Warning, Low Warning and Low Critical thresholds.
5. Click *Apply* when finished.

Power Outlet

Available outlet targets can be viewed under the Targets tab.

To view available serial targets:

1. From the sidebar, click *Power Outlet* and then click on a target to view properties, overview and settings. You can also turn an outlet on, off or cycle power by clicking the buttons at the top of the page.
2. Click *Properties* to view the outlet's ID/name and status. You can also lock or unlock an outlet from this page. A locked outlet cannot be turned on, off or cycled.
3. Click *Overview* to view the outlet number (ref), current (amps), voltage (volts), power (watts), AppPower (volt-amps), power factor, energy and alarm state.
4. Click *Settings* to view and, if supported, configure ID/name, post-on/post-off delays, maximum current, high warning and high critical thresholds, low warning and low critical thresholds for the outlet.

Sensors and Events

Sensors

From the sensors tab, you can view the name, value, time and location for an external sensor connected to the appliance. In addition, you can also view the type and alert for the digital inputs.

Events

The appliance will generate notifications and alerts for a variety of events. When an event occurs on the appliance, it is saved in the event log. If you are an Admin you can view or clear events by clicking on the *Events Summary* tab or view and clear alerts by clicking the *Alerts Summary* tab. An operator can view events or alerts, but cannot clear them.

Clearing an event removes it from the appliance log. Multiple events may be selected in the list and cleared simultaneously. The historical record of the event occurring will remain in the Events Summary tab. Clearing an active alert will reset any associated digital output to its non-active state.

Alert Default Thresholds

Alert	Default Threshold
Fan	5000 RPM*
Temperature (Front sensor)	Greater than 50°C*
Temperature (Back Sensors)	Greater than 66°C*
Power	Off*
CPU	Greater than 98%
Data Partition	Greater than 90%
*Default settings are hard-coded.	

Fan

If a fan is not working or goes below a hard-coded threshold, you will get a fan alert.

Temperature

If the temperature goes above a hard-coded threshold, you will get a temperature alert.

A front sensor for temperature is located on the front panel with two more on the rear panel.

Power

A power supply sensor tells whether the power supply is off or on. If both power cords are originally plugged in, you will get an alert if one of the power cords becomes unplugged. If only one power cord is plugged in initially, you will not receive an alert.

CPU and disk usage

CPU and disk usage are system alerts.

Appendices

Appendix A: Technical Specifications

Technical Specifications

Category	Value
Autosensing Ports	
Number	8 or 40
Connectors	RJ-45
Dimensions	
Form Factor	1 U-rack, mountable
Length x Depth x Height	20 inches x 17.09 inches x 1.7 inches
Weight (without cables)	14.2 pounds
SETUP Port	
Number	1
Type	Serial
Connector	RJ-45
Local Port	
Number/Type	1/DB15
Network Connection	
Number	2
Type	10/100/1000 Ethernet
Connector	RJ-45
USB Device Port	
Number	4
Type	USB 2.0
Power Specifications	
Connectors	2
Type	IEC
Power	
AC Input Range	100-240 VAC
AC Frequency	50/60 Hz
AC Input Current	2A

Category	Value
Rating	
Ambient Atmospheric Condition Ratings	
Temperature	0-50° Celsius
Humidity	20-85 percent non-condensing
Safety and EMC Standards, Approvals and Markings	Safety certifications and EMC certifications for this product are obtained under one or more of the following designations: CMN (Certification Model Number), MPN (Manufacturer's Part Number) or Sales Level Model designation. The designation that is referenced in the EMC and/or safety reports and certificates are printed on the label applied to this product.

Appendix B: Installation Checklist

You can print and refer to the following checklist to assist you with installing the appliance and managed targets.

Appliance Connections Checklist

Number	Installation Step
1	Rack mount or wall mount the appliance. See Rack and Wall Mounting on page 7
2	Connect the redundant power cables to P1 and P2 (100-240 volts).See Connecting the Hardware on page 11
3	Connect at least GB1 to the management network. Connect GB2 to the same management network if you intend to configure the two ports for failover. GB2 can be connected to different networks if the appliance configured in normal mode. See Setting Up Your Network on page 22
4	Connect the tan-colored serial adapter (DB9-RJ45) to a straight CAT5/6 cable. Connect a laptop/PC using this cable assembly to the Setup port on the front of the appliance. Using a terminal emulation program, such as Putty, at 9600 baud access the appliance CLI to configure IP and user settings. Turn off DHCP: set /system/administration/networkManagement/networkInterfaces/eth0/ dhcp=false Assign IP: set /system/administration/networkManagement/networkInterfaces/eth0/ addr=<192.168.0.5> Assign mask: set /system/administration/networkManagement/networkInterfaces/eth0/ mask=255.255.255.0 Assign gateway: set /system/administration/networkManagement/networkInterfaces/eth0/ gateway=<192.168.0.1> -or- Connect a crash cart/LCD tray to the VGA and USB ports on the front of the appliance to access the VGA console and configure IP and user settings. Assign IP/mask/gateway: From the sidebar of the web manager, click *Administration-Network Settings - eth0* Default credentials: username = admin; password = admin. See Web User Interface on page 27
5	Select a networking mode (normal, failover, bridge group). See Bridge Group Configuration on page 34
6	Assign an IP address or addresses to the Eth/Bond0/Bridge group named interface. See Bridge Group Configuration on page 34
7	Verify network connectivity by browsing to https://<appliance IP>
8	Consult the Network Settings-Routes page to ensure the IP network assigned to the priv interface is unique within your organization. If it isn't, access the Targets-Port Configuration-Network Settings page and change the IP addresses assigned to the virtual private interfaces to organizationally unique ones. Be sure to create new DHCP dynamic ranges to match the virtual private interface IPs you changed. SeeNetwork Settings on page 33

Number	Installation Step
9	Physically connect KVM, serial or PDU targets to the appliance. See Connecting targets on page 12
10	To connect SPs to the appliance, First, consult the appliance release notes for a list of supported SP types and firmware versions. Second, access the SP directly to ensure the SP is a DHCP client or has a static IP appropriate for the public network it is connected to or appropriate for the private ports on the appliance. Third, ensure that IPMI is enabled on the SP. Fourth, ensure that you know or change the SP log-in credential to one that is or will be configured within the appliance. Fifth, access the Targets-SP Management-Default Users page and add a credential to the list matching the one configured in the SP. Sixth, physically connect the SP to a private appliance port if it is not already connected to another network. Seventh, if necessary, create a discovery range for the network that contains the SP. See Connecting targets on page 12
11	Rename target devices aliases to user/human meaningful names. For example, hostname, DNS name, physical location name or other. See Port configuration on page 50
12	Change the default account credentials, create additional user accounts or add AD/LDAP or DSView™ software as an authentication service. Create user groups and assign target permissions. See Power User group on page 46
13	Test launching a KVM, vKVM, vMedia, serial, SOL, SSH, browser session to each new target device. Verify power on/off/cycle functionality for non-production systems. See Sessions on page 88
14	Create a system backup to preserve the appliance configuration in case of emergency. See Firmware on page 80

Appendix C: Forgotten Password

If locked out of all administrator accounts, contact technical support with the appliance serial number. Technical support will supply a key that will reset the appliance to the factory default with default accounts.

Appendix D: Booting from the Network

If you're experiencing issues with your appliance, you can perform a Netboot Recovery and load new factory default appliance firmware or restore a previously saved backup image file to the appliance.

The Netboot Recovery file can be obtained from Avocent Technical Support and it must be placed onto an FTP server in order for the Netboot Recovery process to function. A backup image file can also be supplied as the Netboot Recovery file on the FTP server.

To perform a Netboot Recovery:

1. Turn on or reboot the appliance.
2. Select **Netboot Recovery**.
3. Enter **udhcpc** to request a DHCP address for the appliance via GB1 (eth0).

   -or-

   If a static IP needs to be assigned to either GB1 (eth0) or GB2 (eth1), enter the following command:

   NETBOOT> ifconfig eth<x> <IP address> NETBOOT> route add default gw <gateway_ip> eth<x>
4. After the appliance has been assigned an IP [and optional gateway], the firmware can be downloaded by entering the following command:
   NETBOOT> nboot ftp://<username>:<password>@<ftp server>/<path/filename>.

Appendix E: Creating an SP File

In order to have the appliance import a list of service processors, you must create a file containing the SPs. Each line of the file must be in the following format: IP:Port:Username:Password:Profile. Repeat this format for each SP to be added to the list. See SP File Format on page 125 for the syntax descriptions.

Colons must be used to separate the parameters. If a colon is used in either the username or password, you must put the entire username or password in quotes.

The following is an example of a valid SP file:

```
#this is an example of a valid SP file
192.168.200.154:0:root:calvin:drac5
192.168.10.130:0:admin:"pass:word":ilo2
```

SP File Format

Parameter	Description
#	Used to create a comment, if desired. If you add a comment, you must type **#** as the first character on the line with the comment.
IP	The IP address of the SP target.
Port	Not currently used. Enter **0** for this parameter.
Username	The admin name for the SP.
Password	The admin password for the SP.
Profile	The type of SP. If the SP type is not known, enter *.

Dynamic Properties Descriptions

Port	Description
22	Is the SSH port open and listening for connections?
23	Is the Telnet port open and listening for connections?
80	Is there a web interface to this SP (HTTP)?
443	Is there a secure web interface to this SP (HTTPS/SSL)?

Supported SPs

SP Type	SP Type	SP Type
ipmi 1.5	ilo4	rsa_II
ipmi 2.0	ilo3	cisco_us
idrac7	ilo2	fsc_irmc
idrac6	ilo	fsc_irmc_II
drac5	elom	m1000e_cmc
dell_10g	ilom	drac_mc
drac4	alom	hp_blade system
cisco_chassis	generic	blade_center

Appendix F: Troubleshooting SPs

If you cannot discover or manually add an SP, try the following:

- Verify the SP is enabled in the BIOS of the server.
  - Some SP settings are stored in the main BIOS <**F2**> or <**DEL**>.
  - Some SP settings are in an alternate BIOS <**ctrl+D**><**ctrl+E**><**F8**>.
  - Some SP settings are in both the main and alternate BIOS.
- Ensure the SP is using the dedicated interface if the SP is physically connected to the appliance or the network.
- Ensure the SP is sharing or using side-band with NIC1 if the SP will be logically managed.
- Ensure the username and password are correctly configured.
- Access the SP BIOS and reset the password to ensure accuracy of the credentials.
- Ensure the SP has an appropriate IP address assigned.
- Ensure the appliance and the SP are on, or are accessible to, the same network.
- The network must match the IP address of the SP and the network must be able to route the SP to the network the appliance is connected to. This can often be tested by using a ping from the appliance command shell.
  - If you cannot ping the SP, the SP may only allow communication via IPMI. If the username/password and network routing are all correct, the appliance will be able to communicate with IPMI only SPs.
- DHCP works in request-respond fashion. The SP must request a DHCP address before the appliance can provide one. Many SPs will retain their assigned DHCP IP address despite having been turned off or if the cable has been disconnected and re-connected. The best way to resolve this is to force the SP to use a static IP address (save/restart) then reset it to DHCP while connected to the appliance. This will cause the SP to request an address from the appliance, and the appliance can now discover the SP.
- If the SP is accessible and the username/password is correct, verify that IPMI (or Telnet/SSH as appropriate) is enabled in the SP or is assigned to the appropriate NIC interface. Validate the required SP communication protocol and firmware version in the appliance release notes.

Appendix G: Appliance Troubleshooting

LAN performance

If you're experiencing issues between the appliance and the network, issue the **ethtool eth0** or **ethtool eth1** command to determine if the appliance is communicating with the network switch at half duplex. This can happen if the network switch is not set to auto-negotiate speed and duplex (the appliance only supports auto). When a network switch is static and the appliance is auto, the two will not be able to communicate with matching duplex, leading to poor network peformance.

To resolve this, have the network administrator set the network switch port to auto-negotiate speed and duplex.

To assist in troubleshooting issues related to connectivity, sessions, time-outs or other network-related problems, a network traffic packet capture may be performed. At the appliance shell, execute the tcpdump command on one interface at a time that lies within the communication path between the user-appliance and the appliance-target. Save the output of the tcpdump to the /download directory, then copy the output file to a workstation for analysis using tools such as WinSCP and Wireshark.

For example, to capture from both the eth0 and the priv interfaces:

tcpdump -i eth0 -w /download/networktrace1.cap and **tcpdump -i priv -w /download/networktrace2.cap**

WAN performance

If KVM, virtual media or firmware uploads are slow or fail across a network WAN, many network routers that connect to WAN links (Frame Relay, ATM, SONET or VPN) often are set to fragment large IP packets into smaller chunks. The maximum size of an IP packet is defined as MTU within all devices connecting to networks. The appliance's MTU defaults to 1500 bytes and the appliance sends all traffic with the "Don't Fragment" bit enabled in the IP header. An IP packet that doesn't want to be fragmented is discarded by a router that must fragment large packets before transmitting them across a WAN link.

To resolve this, you can decrease the size of the appliance's MTU in the network settings, which will generate smaller IP packets. This will increase the total number of packets that get created, but they will be small enough to cross the WAN link without being discarded and should improve the situation. Don't do this unless you are sure that the appliance traffic is being discarded by the customer WAN router because of fragmentation.

Bridge groups

When creating a bridge group inside of the appliance, there is a default setting to "Enable STP." STP (Spanning Tree Protocol) is a network switch methodology for eliminating switching loops caused by redundant network connections. STP requires network switches to send out a BPDU (bridging protocol data unit) which is essentially an ID that identifies the sending switch.

All switches receive these BPDUs across all connections to that switch and compare it to their own BPDU. If the same BPDU comes in on more than one connection, the switch determines one of those connections to be redundant and it will disable that link. This can happen if you connect two appliance ports to a network switch and place both of the appliance ports into a single bridge group. Most enterprise network switches have a feature called BPDU_guard which is intended to be enabled on ports that are not supposed to be connected to other network switches (Cisco Nexus switches enable this feature by default on all interfaces).

If you connect an appliance to a switch with the BPDU_guard active, then you must disable STP if you plan to create a bridge group on that appliance. If you don't disable STP, the network switch will disable its connection to the appliance when a bridge group is created. It will do this because the appliance will send out its own BPDU when the STP option is enabled.

Hardware

The appliance has a boot menu option to help you troubleshoot hardware issues. Choosing to boot the appliance to its hardware diagnostics mode can quickly help you identify if it has bad memory.

To identify other types of hardware problems, issue the following shell commands using an appliance that boots properly:

Shell Hardware Diagnostic Commands

Type	Command
Fan Failure	cat /sys/devices/platform/dcima_hwmon.2560/fan*
Temp Issues	cat /sys/devices/platform/dcima_hwmon.2560/temp*
Power Supply issues	cat /sys/devices/platform/dcima_hwmon.2560/voltage*

If the diagnostic test reveals a hardware failure, contact Avocent Technical Support. Firmware bugs can be resolved through a clean load of firmware via the NetBoot menu or USB_boot procedure.

Appendix H: Troubleshooting From the Appliance Shell

The appliance shell is a powerful tool for advanced troubleshooting and debugging. The following commands are examples of various ways to troubleshoot for performance and potential network-related issues.

Network related

Example 1: Network related issues can sometimes be difficult to diagnose and troubleshoot. An appliance that seems to communicate on the network without issue yet provides slow performing sessions (KVM) could be suffering from a half-duplex issue.

ethtool

To troubleshoot speed and duplex negotiation issues, the ethtool command may be useful.

```
ethtool <interface>
```

netstat

Use the netstat command to identify where network traffic is flowing.

```
netstat -in
```

iostat

Use the iostat command to show CPU load, hdd and memory load. This is useful to help identify if a bad memory module or hard drive is affecting performance.

```
iostat
```

To perform in-depth network traffic analysis, the tcpdump command can be used to capture traffic to a file which can be imported into third-party tools.

tcpdump -w networkcapture.cap

It's possible to create elaborate scripts which can significantly aid in the troubleshooting process. One example script is provided below, which uses the netstat command to display established network connections sortable by activity. The script can be created using VI and saved to the /download directory. The syntax for running the script is

./<script_name> <refresh_interval> <rows_displayed> <s | r> (sent | received).

```
#!/bin/sh
# -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
# monitorNETSTAT.sh
# Use netstat to display tcp network usage by process
# -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
```

```
if [ $# != 3 ]
then
echo "Usage monitorNETSTAT.sh sleep topN sortQ"
echo "Where sleep - seconds to sleep between samples"
echo " topN - top number of rows to return"
echo " sortQ - [r|s] to sort on (r)ecv-q or (s)end-q"
exit 1
fi
SLEEP=$1
TOPN=$2
if [ "${3}" = "r" ]
then
SORTQ=2
else
SORTQ=3
fi
while [ 1 ]
do
netstat -t -p | grep Recv-Q > netstatHEAD.lst
netstat -t -p | grep tcp | sort -k ${SORTQ} -g -r > netstatDETAIL.lst
clear
cat netstatHEAD.lst
head -n ${TOPN} netstatDETAIL.lst
echo " -- -- -- -- -- -- -"
echo "Status Counts"
echo " -- -- -- -- -- -- -"
cat netstatDETAIL.lst | grep tcp | cut -c 77-88 | sort -u |\
while read netstatSTATUS
do
statusCnt=`cat netstatDETAIL.lst | grep $netstatSTATUS | wc -l`
echo $netstatSTATUS $statusCnt
done
sleep ${SLEEP}
done
```

Appendix I: IP Masquerading for 1-to-1 NAT

To set up a 1-to-1 NAT, you will first need to create a virtual public interface. The virtual public interface will appear within the Firewall and NAT screens of the appliance:

Input /usr/bin/fwnat/**fwnat-alias.sh**

Usage: ./**fwnat -alias** [-h] **-c** <add|del|mod> **-i** <eth0 | eth1> **-n** <ifname> **-a** <cidr formated IP> **-b** <broadcast address>

Virtual Public Interface Syntax and Options

Syntax	Option
-h	Displays the command syntax.
-c	Adds, deletes or modifies an aliased interface.
-i	Alias for eth0 | eth1
-n	Name of the alias up to eight characters.
-a	IP address in CIDR format.
-b	Broadcast address.

For example: Use the following command to create the public IP alias for the appliance to listen for incoming traffic:

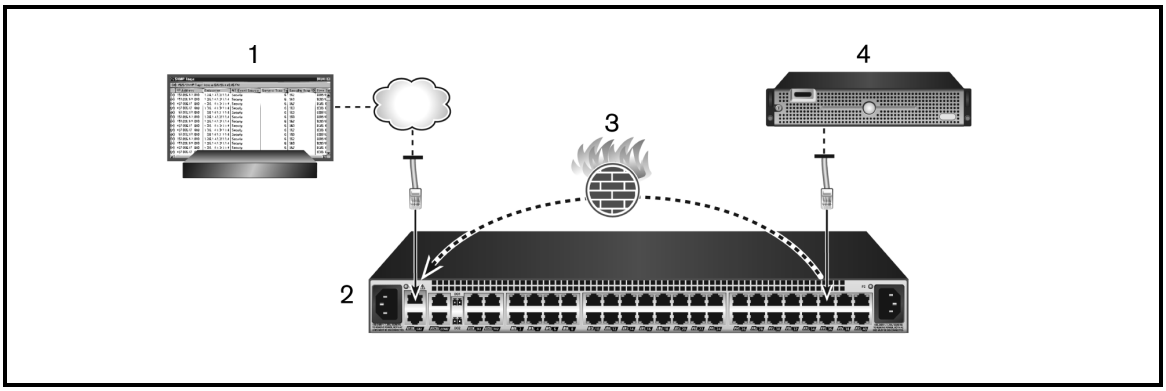
/usr/bin/fwnat/**fwnat-alias.sh -c add -i** eth0 **-n** ILOalias **-a** 192.168.200.17/24 **-b** 192.168.200.255

For more information, see Firewall and NAT on page 90.

Appendix J: Firewall and NAT Configuration Scenarios

Firewall and NAT scenario 1: Forwarding SNMP traps from an SP to an external receiver.

Scenario 1 Diagram



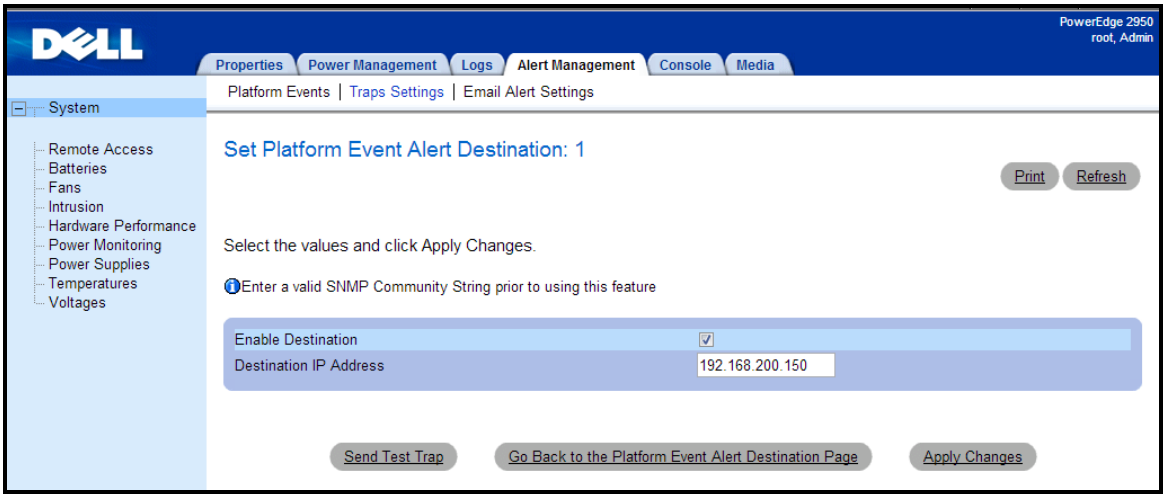
Scenario 1 Diagram Descriptions

Number	Description
1	External trap receiver server/console
2	Appliance
3	Appliance firewall
4	Service processor

To forward an SNMP trap:

1. Add the SP to the appliance.
2. Configure the SP to send traps to an external receiver server.

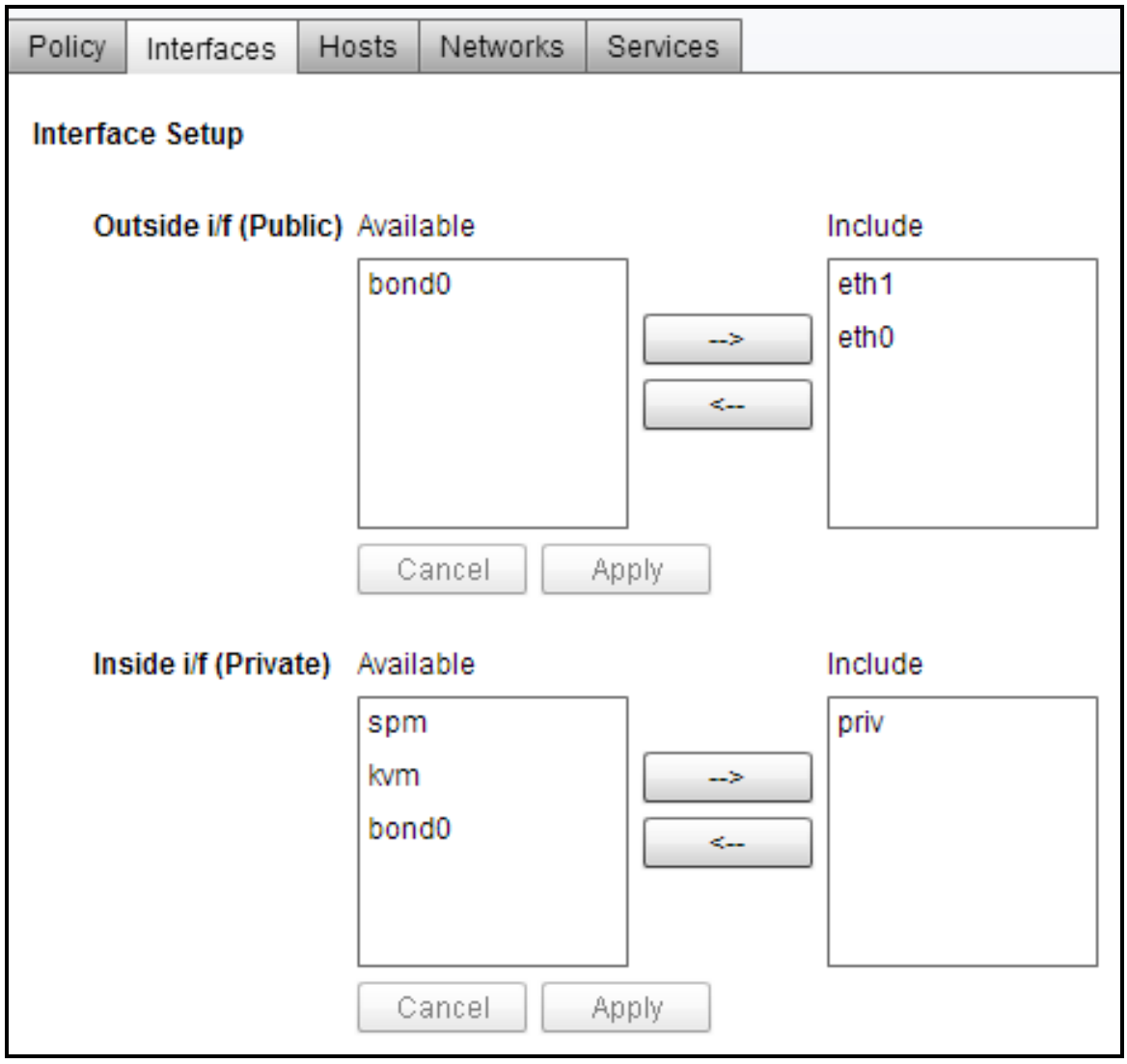
Forwarding an SNMP Trap



3. On the appliance, from the sidebar of the Administration tab, click *Firewall and NAT - Interfaces* to set up the firewall interfaces.

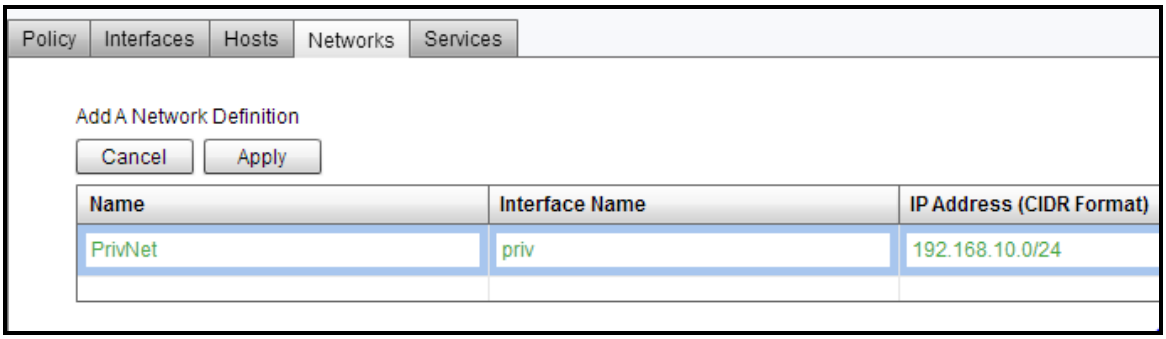
NOTE: Use eth0 for outside and priv for inside.

Setting Up Firewall Interfaces



4. Click *Networks* to add a network definition that will encompass the IP of the SP that was added. Enter a definition name, associated interface name and network address. Click *Apply* when done.

Adding a Network Definition



5. Click *Policy* to add an outbound NAT Policy by entering the following information. Click *Apply* when done.

NAT Policy Parameters

Column	Parameter
Direction	Outgoing
Order	Lowest unused number. Example: 1
Interface	eth0
Source	Name of network definition. Example: PrivNet
Destination	any
Service	Name of the service definition. Example: srv-SNMP-Traps
Translated Source	eth0
Translated Destination	any
Translated Service	Name of the service definition. Example: srv-SNMP-Traps
Rule State	Active

6. From the Policy tab, create a firewall policy with the following settings:

Firewall Policy Parameters

Column	Parameter
Action	Accept
Rule State	Active
Destination	any
Interface	any
Direction	Forward
Order	Lowest unused number. Example: 53
Source	Name of network definition. Example: PrivNet
Connection Status	Not needed

7. Click *Apply* when done.
8. From the SP, test sending traps and validate the successful configuration.

Appendix K: SNMP Configuration

An administrator can access the snmpd daemon on the appliance to add the appliance to an environment as a monitored device.

To configure the appliance as a monitored device:

1. Connect to the console interface of the appliance using Putty.
2. Log in as **admin**.
3. From the presented menu, select *shell.*
4. Edit the snmpd.conf file which is located in the /etc/snmp folder.
5. Restart the snmpd deamon by typing **/usr/bin/restartsnmpsvr.**
6. You can now add the appliance to the desired monitoring tools.

Appendix L: Video Resolution

The following table lists the video resolutions supported in the UMIQ module's EDID.

Supported Video Resolution

Video Resolution	Standard	Widescreen	Standard 1024 x 768	Standard 1280 x 1024	Standard 1600 x 1200	Widescreen 1280 x 800	Widescreen 1680 x 1050	Widescreen 1920 x 1080
640 x 400 @ 60 Hz	x	x	x	x	x	x	x	
640 x 480 @ 60 Hz	x	x	x	x	x	x	x	
640 480 @ 67 Hz	x	x	x	x	x	x	x	
640 x 480 @ 72 Hz	x	x	x	x	x	x	x	
640 x 480 @ 75 Hz	x	x	x	x	x	x	x	
704 x 528 @ 60 Hz	x	x	x	x	x	x	x	
704 x 528 @ 72 Hz	x	x	x	x	x	x	x	
720 x 400 @ 70 Hz	x	x	x	x	x	x	x	
720 x 400 @ 88 Hz	x	x	x	x	x	x	x	
720 x 480 @ 60 Hz	x	x	x	x	x	x	x	
768 x 576 @ 60 Hz	x	x	x	x	x	x	x	
768 x 576 @ 72 Hz	x	x	x	x	x	x	x	
800 x 500 @ 60 Hz	x	x	x	x	x	x	x	
800 x 600 @ 56 Hz	x	x	x	x	x	x	x	
800 x 600 @ 60 Hz	x	x	x	x	x	x	x	
800 x 600 @ 72 Hz	x	x	x	x	x	x	x	
800 x 600 @ 75 Hz	x	x	x	x	x	x	x	
832 x 624 @ 75 Hz	x	x	x	x	x	x	x	
853 x 480 @ 60 Hz	x	x	x	x	x	x	x	
896 x 672 @ 60 Hz	x	x	x	x	x	x	x	

Video Resolution	Standard	Widescreen	Standard 1024 x 768	Standard 1280 x 1024	Standard 1600 x 1200	Widescreen 1280 x 800	Widescreen 1680 x 1050	Widescreen 1920 x 1080
896 x 672 @ 75 Hz	x	x	x	x	x	x	x	
896 x 672 @ 85 Hz	x	x	x	x	x	x	x	
960 x 720 @ 60 Hz	x	x	x	x	x	x	x	
960 x 720 @ 75 Hz	x	x	x	x	x	x	x	
960 x 720 @ 85 Hz	x	x	x	x	x	x	x	
1024 x 640 @ 60 Hz	x	x	x	x	x	x	x	
1024 x 640 @ 75 Hz	x	x	x	x	x	x	x	
1024 x 768 @ 60 Hz	x*	x	x*	x*	x*	x	x	
1024 x 768 @ 70 Hz	x	x	x	x	x	x	x	
1024 x 768 @ 75 Hz	x	x	x	x	x	x	x	
1024 x 768 @ 85 Hz	x	x	x	x	x	x	x	
1024 x 768 @ 87 Hz	x	x	x	x	x	x	x	
1152 x 864 @ 60 Hz	x	x		x	x	x	x	
1152 x 864 @ 70 Hz	x	x		x	x	x	x	
1152 x 864 @ 75 Hz	x	x		x	x	x	x	
1280 x 720 @ 60 Hz	x	x		x	x	x	x	
1280 x 720 @ 70 Hz	x	x		x	x	x	x	
1280 x 720 @ 75 Hz	x	x		x	x	x	x	
1280 x 720 @ 85 Hz	x	x		x	x	x	x	
1280 x 768 @ 60 Hz	x	x		x	x	x	x	
1280 x 800 @ 60 Hz	x	x		x	x	x*	x*	
1280 x 800 @ 75 Hz	x	x		x	x	x*	x*	
1280 x 960 @ 60 Hz	x	x		x	x		x	

Video Resolution	Standard	Widescreen	Standard 1024 x 768	Standard 1280 x 1024	Standard 1600 x 1200	Widescreen 1280 x 800	Widescreen 1680 x 1050	Widescreen 1920 x 1080
1280 x 960 @ 75 Hz	x	x		x	x		x	
1280 x 1024 @ 60 Hz	x	x		x	x		x	
1280 x 1024 @ 75 Hz	x	x		x	x		x	
1360 x 768 @ 60 Hz	x	x			x		x	
1365 x 768 @ 60 Hz	x	x			x		x	
1400 x 1050 @ 60 Hz	x	x			x		x	
1400 x 1050 @ 72 Hz	x	x			x		x	
1400 x 1050 @ 75 Hz	x	x			x		x	
1400 x 1050 @ 85 Hz	x	x			x		x	
1440 x 900 @ 60 Hz	x	x*			x		x	
1440 x 900 @ 75 Hz	x	x*			x		x	
1600 x 900 @ 60 Hz	x	x			x		x	
1600 x 900 @ 75 Hz	x	x			x		x	
1600 x 900 @ 85 Hz	x	x			x		x	
1600 x 1200 @ 60 Hz	x	x			x*		x	
1680 x 1050 @ 60 Hz	x	x					x*	
1920 x 1080 @ 60 Hz	x	x						x*

NOTE: * denotes the preferred/default resolution.

Technical Support Site

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures. For additional assistance, visit www.avocent.com/support.

Avocent Community Support Site

To search product knowledge content,
visit community.emerson.com/networkpower/support/avocent.

About Emerson Network Power

Emerson Network Power, a business of Emerson (NYSE:EMR), delivers software, hardware and services that maximize availability, capacity and efficiency for data centers, healthcare and industrial facilities. A trusted industry leader in smart infrastructure technologies, Emerson Network Power provides innovative data center infrastructure management solutions that bridge the gap between IT and facility management and deliver efficiency and uncompromised availability regardless of capacity demands. Our solutions are supported globally by local Emerson Network Power service technicians. Learn more about Emerson Network Power products and services at **www.EmersonNetworkPower.com**.

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